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October, 1948

EDISON ELECTRIC INSTITUTE BULLETIN

GEOGRAPHY, RESOURCES & INDUSTRIES

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PUBLISHED MONTHLY BY EDISON ELECTRIC INSTITUTE

ELECTRICAL RESEARCH STATISTICS
THE ELECTRIC LIGHT AND POWER INDUSTRY

Current Statistical Data Covering 100 Per Cent of Industry

July, 1947-1948

SOURCE AND DISPOSAL OF ENERGY—MONTH OF JULY

	1948	1947	%
GENERATION* (Net)			
By Fuel Burning Plants	16,430,386,000	14,235,702,000	+15.4
By Water Power Plants	6,851,669,000	6,546,253,000	+ 4.7
Total Generation	**23,282,055,000**	**20,781,955,000**	**+12.0**
Add—Net Imports Over International Boundaries	97,300,000	136,110,000	−28.5
Less—Company Use	117,102,000	126,453,000	− 7.4
Less—Energy Used by Producer	457,728,000	361,237,000	+26.7
Net Energy for Distribution	**22,804,525,000**	**20,430,375,000**	**+11.6**
Losses and Unaccounted for	3,437,180,000	3,122,425,000	+10.1
Sales to Ultimate Customers	**19,367,345,000**	**17,307,950,000**	**+11.9**

CLASSIFICATION OF SALES

NUMBER OF CUSTOMERS—As of July 31st			
Residential or Domestic	32,678,145	30,781,631	+ 6.2
Rural (Distinct Rural Rates)	1,634,816	1,454,857	+12.4
Commercial or Industrial:			
Small Light and Power	5,076,042	4,866,793	+ 4.3
Large Light and Power	199,576	185,646	+ 7.5
Other Customers	137,915	130,186	+ 5.9
Total Ultimate Customers	**39,726,494**	**37,419,113**	**+ 6.2**
KILOWATTHOUR SALES—During Month of July			
Residential or Domestic	3,822,845,000	3,307,228,000	+15.6
Rural (Distinct Rural Rates)	636,515,000	606,326,000	+ 5.0
Commercial or Industrial:			
Small Light and Power	3,653,012,000	3,123,454,000	+17.0
Large Light and Power	10,035,498,000	9,068,444,000	+10.7
Street and Highway Lighting	169,810,000	159,811,000	+ 6.3
Other Public Authorities	489,158,000	459,309,000	+ 6.5
Railways and Railroads:			
Street and Interurban Railways	304,733,000	329,599,000	− 7.5
Electrified Steam Railroads	203,161,000	208,753,000	− 2.7
Interdepartmental	52,613,000	45,026,000	+16.9
Total to Ultimate Customers	**19,367,345,000**	**17,307,950,000**	**+11.9**
Revenue from Ultimate Customers	**$348,135,800**	**$305,854,600**	**+13.8**

RESIDENTIAL OR DOMESTIC SERVICE

AVERAGE CUSTOMER DATA—for 12 months ended July 31st			
Kilowatthours per Customer	1,513	1,392	+ 8.7
Average Annual Bill	$45.84	$43.57	+ 5.2
Revenue per Kilowatthour	3.03¢	3.13¢	− 3.2

(*) By Courtesy of the Federal Power Commission.

Vol. 16, No. 10, EDISON ELECTRIC INSTITUTE BULLETIN; published monthly. Entered as second-class matter Aug. 17, 1933, at the post office at Philadelphia, Pa., under the act of March 3, 1879. Publication office, 56th and Chestnut Sts., Philadelphia 39, Pa. Editorial office, 420 Lexington Ave., New York 17, N. Y. Subscription rate $2.00 per year in the United States; $3.00 per year in foreign countries.

The Edison Electric Institute does not assume responsibility for, nor necessarily endorse or approve, statements made by contributors to the BULLETIN.

EDISON ELECTRIC INSTITUTE BULLETIN

Volume 16 OCTOBER, 1948 No. 10

Why Business Men and Taxpayers Outside the Tennessee Valley Oppose the New Johnsonville Steam Plant

By Ernest R. Acker

President, Edison Electric Institute

An address presented before the Annual Convention of the Indiana Electric Association, French Lick, Ind., October 14, 1948

THE TVA power system, built in connection with a navigation and flood control project, is now approaching, in its growth and development, an important dividing line—one that goes to the roots of the American constitutional free enterprise system. Since additional water power possibilities in the area are limited, the development of steam power in the not too distant future is the only apparent method by which the increased demand for electricity can be met.

Regional Socialism and Nationalization

The result is that the Tennessee Valley Authority has reached another decisive crossroad on the march toward regional socialism on a large scale. The decision as to which road Congress shall permit this favored and powerful authority to take affects not only the Tennessee Valley, as some would try to make America believe, but it will also affect many other regions of the United States and ultimately the entire country.

Representative Keefe of Wisconsin, in the debate on the New Johnsonville steam plant in Congress, clearly stated the point as follows:

> "No one can claim that if you start on this steam plant program that it will not expand all over the United States. The simple fundamental question that you must determine here and now when you vote on this amendment is, are you going to vote for nationalization of the power interests of this country? If you believe in the nationalization of power, then you ought to support this amendment. If you do not, you ought to vote it down."

The decision on this issue affects not merely the private power business, which still produces 80 per cent and distributes 85 per cent of the electrical requirements of the country, but it affects every American business. It concerns most seriously the hard-earned economic well-being of many of the long established industrial areas of the country, and it is this threat which I shall discuss more fully in my later remarks.

Shall Taxpayers Foot the Bill?

The dividing line to be respected or broken is this: Shall the Federal Government, which has already spent many hundred million dollars of the taxpayers' money to build multi-purpose navigation, flood control and power dams, transmission systems to dispose of the power therefrom, and steam stations to firm up such power, stop at that point and go no further; leaving it to the local agencies, singly or however they may elect, to provide at their own expense the additional power required to take care of the growth of their loads; or shall the federal taxpayer be committed by Congress to footing the bill for the construction of steam generating plants to supply the future power requirements of the TVA or other areas served by governmental projects?

The Decision Before Congress

Mr. D. J. Guy, Manager of the Natural Resources Department of the Chamber of Commerce of the United States, has expressed the issue so well that I wish to repeat his statement.

> " . . . power sales for the whole country are expected to increase 72 per cent in the next decade. No one would deny the Valley the privilege of sharing this growth; nor did the House of Representatives in refusing TVA $4,000,000 to start a $54,000,000 steam generating plant. Steam power development is a commercial undertaking, not a conservation measure. By no stretch of the imagination can it be hung on the late Senator Norris' 'Constitutional peg'—navigation. So a new issue is raised—Who puts up the money for new power supply in the Valley from now on? Will it be the general taxpayers who financed river control in the Valley to completion, or will it be the Valley people themselves? The question has nation-wide application, for Congress must treat all sections alike."

The proposal to break over the bounds and to open the road to more socialism was rejected by Congress earlier this

year, but that fact may be considered of temporary significance. True, this is the first important defeat the TVA has suffered, but the history of the past 100 years indicates that when a governmental authority is on the march, in this country or in any other country, one defeat is merely an incident in its course. Every victory is an established gain. We have seen little effective resistance to the spread of national authority and no recovery of lost ground—ground which was won at great cost and which the makers of our Constitution endeavored so firmly to preserve for future generations in this country.

Real Issue Obscured

We may take it for granted that this far-reaching socialistic proposal will come before the next Congress, and that its advocates, having failed to obtain the desired authorization for their huge steam station project, are now putting forward deceptive claims to gain wider public support when next they go before Congress to urge that the plant be authorized. They endeavor to make it appear that a vote against the project is a vote to deny any future power supply to the TVA region; that a greedy adversary would starve the region by stopping any further growth of its power load. This is an obvious deception designed to distract attention from the real issue which, again, is simply this: Shall the federal taxpayer, having already been called upon to make an enormous power contribution to this favored area as an incident to navigation and flood control, now be called upon to make large additional capital expenditures to provide through TVA for the further power development of the area? Or, shall the local distributing agencies assume the responsibility to provide for their own requirements, just as several hundred municipal power systems, associations and districts have done in other parts of the country ever since they were organized—most of them several decades ago?

Of course, if the local distributing agencies of the TVA must meet the full cost of new power plants and transmission lines, their resultant unit costs will be materially increased. Under the circumstances they are obviously reluctant to face the prospect of adjusting their economies to higher cost power and thus lose the advantage they have enjoyed in luring industry to the area at the expense of other regions.

The TVA dislikes the prospect because its functions would cease to grow, and all possibility of extending its operations into wider areas would be terminated.

Another fallacious claim of the advocates of the TVA steam station project, and one which is designed to corral favorable, and frighten off unfavorable, votes in Congress is worth noting. It is the claim that the power companies are the sole, or at least the only important adversary blocking their further access to the Federal Treasury. This is far from true, as may readily be seen by reference to the record of the hearings before Congressional committees and the debate in Congress on this appropriation item.

In this record three things stand out. First, that there is in Congress dissatisfaction with the conduct of TVA and concern over its broad economic and political powers. Second, that there is concern on the part of many members in Congress over the consequences of the present high rate of federal expenditure. Third, that there is widespread complaint by many Chambers of Commerce and taxpayers' associations against the unfair policy of using their taxes to subsidize the competition of industry against them and in favor of the TVA area. It is apparent that these strong objections, coming from so many parts of the country, had a deciding influence on the thinking of the last Congress. Here was opposition which Congress, as evidenced by its vote, recognized as having a just cause.

Federal Lobbies' Objections

The pleadings of the power company representatives before Congressional committees had, in my opinion, little influence on the ultimate action of Congress in defeating the appropriation. I judge that most utility men would fail to be impressed by TVA claims to the contrary.

We have witnessed for nearly 30 years the enactment by Congress of discriminatory tax laws in favor of governmental power systems, the making of loans and grants to such systems, the voting of huge appropriations for governmental power developments with preference clauses in favor of governmental power bodies, and at the same time we have seen the enactment of restrictive legislation against our own electric companies. If this record indicates legislative influence on the part of the privately owned power industry, I fail to see it. Instead, I think the legislative record clearly reveals the strong influence which the powerful lobbies of the Federal bureaus, commissions and authorities have continuously exercised over Congressional enactments. I therefore conclude that the angry cry that the power companies blocked the TVA steam plant is designed to divert attention from the source of the real opposition to which I have previously referred.

Protests On Record

The record in this controversy indicates so plainly the influence which the protests of business and taxpayer organizations exercised over the voting in Congress, I would like to quote some representative extracts from their presentations.

Chamber of Commerce of Pittsburgh:

"But we do object, and strenuously, when the TVA proposes to use our money to build steam power plants to provide cheap power to lure industries away from us or to offer advantages to the TVA district that we cannot offer."

Hartford Chamber of Commerce:

"Our sentiments were perhaps best expressed in the editorial columns of a Connecticut paper last month as follows:

"'Ever since the Tennessee Valley power development was put into operation at Government expense, the State of Tennessee has been advertising the advantages of cheap power there as an inducement to get industries to move in from other parts of the Nation. Why, in all fairness, should the industries of Connecticut be obliged to pay into Government coffers taxes that are used to provide cheap electric power for companies that will use this subsidy to make a sale rate with which Connecticut must strain to compete, or cannot compete? Why should Connecticut find its efforts to keep old industries and its invitation to new ones to locate here frustrated by the fact that Government kindness makes Tennessee a more profitable location?'"

Ohio Chamber of Commerce:

"The Ohio Chamber of Commerce submits the proposition that it is unfair to expect the taxpayers, industry, and labor of any State to subsidize a tax-free, Government-sponsored regional authority which in its operation would undermine their own progress and prosperity."

Kansas Independent Businessmen's Association; statement of Grey Dresie, Sec.:

"We have for a long time watched with dismay and anger the constant trend of certain branches of government into competitive fields of enterprise. We know

that it is our tax payments that make these invasions of private business possible, and we have long since determined to register our protest whenever further expenditures of this kind are attempted."

West Virginia Chamber of Commerce:

"Before 1940 West Virginia had 1.8 per cent of the industrial plants in the United States, and Tennessee had 2.2 per cent of the industrial plants in the United States.

"As of today, and speaking of plants built from 1940 to 1947, West Virginia has only 1 per cent of the plants of the United States, whereas Tennessee has 3.9 per cent of the plants in the United States."

President of the National Associated Businessmen, Kileville, Ohio:

"We believe that a dangerous and pernicious precedent would be established by the authorization of this steam plant (New Johnsonville steam plant), since other so-called river authorities to create electric energy are contemplated and all of them would inevitably follow the lead of TVA in demanding monopolistic privileges in the areas in which they will operate.

"We believe it is an evil system for Government to promote the facilities of four or five States at the expense of the people of the other 43 or 44 States.

Where Does Government Competition Lead To?

"We believe that if TVA is permitted to go into outright competition with the electric business, as it proposes, the way is opened for Government to engage in any line of business, with eventual socialization of and nationalization of our whole economy.

"We believe that the small-business man, who pays his taxes and pays interest on the money that he has to borrow from the bank, should be given Congressional assurance that the unfair competition he now faces from non-taxpaying, non-interest-paying, subsidized businesses is to come to an end before he is bankrupted and driven out of business."

John H. Bream, Secretary, Pennsylvania Tax Equality Committee, Inc., Harrisburg, Pa.:

"Nor are they (the members of our organization) content to have their State taxes increased, along with their Federal taxes, by a Government policy that says in effect to our industries: 'Get out of Pennsylvania, where your taxes are high and your electric power costs full price, and come to Tennessee Valley where we will furnish power at the lowest rates you ever saw because the other 47 States are paying the bills.' "

Garner M. Lester, President, National Tax Equality Association, Jackson, Miss.:

"Our association has long been on record in opposition to the income-tax-free status of the Tennessee Valley Authority and all other Government corporations that have entered the market place in competition with taxpaying, privately owned companies. We are also on record in opposition to the Government's providing capital for corporations set up under its sponsorship without requiring the payment of interest for the use of public money."

Political Tax "Brokerage"

George T. Holmes, Secretary, Kentucky Tax Research Association, Louisville, Kentucky:

"We know our dollars that go to Washington in taxes invariably come back to us considerably less than dollars —because of the political brokerage that is exacted. Today, we may be getting more than we pay, because the whole Nation is paying for TVA. Tomorrow the story will likely be quite different— we may get far less than we pay."

John D. Langmuir of the New Hampshire Taxpayers' Association:

" . . . TVA expansion simply will extend their ability to weaken the ability of New Hampshire industry to compete with Tennessee Valley industry, now partly subsidized by the taxes of 47 other States."

Edward Staples, Missouri Public Expenditure Survey:

"It does not seem just that taxpayers in Missouri should have to help subsidize low power rates in another part of the country which is competing with Missouri on the location of business and industry."

Washington State Taxpayers' Association:

" On many occasions the people of the State of Washington have indicated their lack of confidence in the creation of a super State control over the development of the Columbia River Valley. . . . The Washington State Taxpayers' Association therefore believes it is representing the majority view of the citizens in its State when it asks you to oppose in its behalf any appropriation which would permit TVA to expand its power functions."

Three excerpts from the Congressional debates on the TVA steam plant will suffice to indicate that the validity of these complaints, which represent only a sample of the total submitted, was recognized by the Congress.

Senator Baldwin (Conn.) said:

"The point I make is that the reason why the present capacity is overloaded now is because of some big industries that are going there and some other big industries that may very well be attracted there, that will leave people in other parts of the country without employment or else require them to move into this section of the country and compete for jobs with the people already there."

Representative Bates of Massachusetts said:

"In the daily papers we read that the private industries in the New England areas and in the other great industrial areas of the country are building their own power plants at their own expense. Why then should we authorize power plants to be built in the Tennessee Valley area with public money in order that low-cost electricity may be provided for competing industries to those industries in our part of the country?"

Johnsonville Plant a Crossroad

Congressman Coudert (N. Y.) said:

"What is the matter with those great companies who are presently cashing in on the subsidized cheap power? Cannot each one of those companies build a steam plant for its own surplus requirements just as cheaply as can the taxpayers of the United States? Is there any reason, even, why some of the great cities and municipalities of the area should not build their own steam plants?"

These few extracts drawn from many pages of testimony and debate indicate, in my opinion, the true and basic reason for the refusal of Congress to authorize and appropriate funds for starting the New Johnsonville project. They demonstrate forcefully that business and taxpayer organizations are convinced that a broad and fundamental issue has been joined in Congress and that a most important legislative cross-road has been reached, one branch following the path

of free enterprise and the other leading to nationalization, first of the power industry and then of other basic industries.

The course of socialism in England and France in recent years and the history of other countries make it abundantly clear that once a government takes this initial step toward socialization further extension of the process is inevitable. Mr. David Lilienthal of TVA fame clearly stated the issue, if it were not already perfectly plain, when he said, "Those who control energy control people,"* which means, of course, the control of votes and of economic and political liberty.

Non-Political Power Industry

The American free enterprise system has developed and placed the power industry of the nation in the vanguard of modern industrial service to mankind. It accomplished its purpose without control over the votes or liberties of the people. Its employees and stockholders have had complete freedom of choice in the exercise of their individual citizenship. Collectively they represent a very small percentage of the body politic and thus have little control of local, state or national political policy. Under the regulatory control of appointed and elected representatives of the people, the only real power of the utility industry has been and is the excellence of its service and the support of satisfied customers. The developments of the past have been brought about through technical skill and managerial efficiency in a free enterprise system. Under similar conditions the industry may be depended upon to do the job in the future.

Here lies the real issue of the New Johnsonville steam plant. Shall the taxing power of the Government be used to crush and destroy the free enterprise system or shall this nation through Congress call a halt? When next this proposal comes before Congress we may expect that it will be put in a most appealing light.

No stone will be left unturned to get at least the authorization and, sooner or later, the desired appropriation of federal funds. Their success at the next try will depend on whether or not the business and taxpayer associations from all over the country again take the time and go to further expense to make clear to Congress that they are strongly opposed to this course and that their opposition is genuine and fundamental—not whimsical or spiteful.

It is said that the price of liberty is eternal vigilance. If America is not to take the authoritarian way, American business, big and little, must continue to oppose the abuse of the federal taxpayer as an instrument to destroy private initiative.

As one American, I hope that the Congress of the United States no matter what pressure may be brought to bear for authorization of the New Johnsonville steam plant will cast its vote with a full realization of the ultimate effect on the free enterprise system of our country. If the potential danger is clearly understood the vote will be against this unconstitutional, un-American proposal.

* "Atomic Energy and the People," article by David E. Lilienthal, in *The Progressive Farmer*, October 1945.

Liversidge Honored on Fiftieth Anniversary With Philadelphia Electric Co.

HORACE P. LIVERSIDGE, chairman of the board of Philadelphia Electric Company, was presented with a gold medal on Oct. 12 when nearly 3000 Company employees gathered in the Broadwood Hotel to honor the executive on his fiftieth anniversary with the utility.

A highlight of the program was the showing of a biographical motion picture which traced Mr. Liversidge's career from his first job as a "trouble shooter," with the Edison Electric Light Company, forerunner of P. E., to his present position.

The medal honoring the utility official, executed by Julio Kilenyi, a well-known sculptor, is embellished with the legend, "For those with faith, opportunity abounds." Mr. Liversidge's service record with Philadelphia Electric is also recorded on the medal.

In accepting the medal honoring his golden anniversary, Mr. Liversidge lauded Philadelphia Electric Company employees and said that, "the preeminence of the Company in the utility field was not due to any one individual, but to the joint efforts of all members of the P. E. family." The Company chairman noted the fact that nearly 2000 employees have been with the Electric Company for 25 years or more.

Picturing a glowing future for the utility industry, Mr. Liversidge said, "The science of electricity is just coming of age. With the harnessing of atomic energy and its eventual application to peacetime uses, we may expect a new era of opportunity in virtually every field of human endeavor."

The meeting was sponsored by P. E.'s employees' association in cooperation with the Company's quarter century club, and athletic association.

Completed model for the gold medal presented to Horace P. Liversidge, chairman of the board of Philadelphia Electric Company, by company employees at ceremonies marking his fiftieth anniversary with the utility. Pictured above is Julio Kilenyi, noted sculptor, who designed the medal.

Expansion Program Broadens Activities of EEI Commercial Committees

By James T. Coatsworth

Commercial Director, Edison Electric Institute

TWENTY-ONE million kilowatts of new generating capacity must be paid for. To help finance expansion, our industry must issue securities. To sell securities successfully, we must show a favorable income picture.

And there, in these three "musts" is the logic behind the broadened activities for the current year of the 17 committees of the Edison Electric Institute's Commercial Division. Some 250 electric company sales and advertising executives, joined together in these committees, are devoting many hours of effort to the job of helping EEI member companies increase sales of desirable load, and so keep net revenues attractive despite rising costs—to the continuing task of preparing promotional aids, special market studies, committee reports and other aids that will help the industry to meet aggressive competition and convince its rural, residential, commercial and industrial customers that whatever the problem, whatever their need, it can be done better electrically.

Restofski Heads Division

The Commercial Division is headed by HARRY RESTOFSKI, Chairman of the Commercial Division General Committee and General Sales Manager, West Penn Power Company, Pittsburgh, Pa.

HARRY RESTOFSKI

Chairman of the Commercial Division General Committee—General Sales Manager, West Penn Power Co., Pittsburgh, Pa.

For efficient operation, the Division is organized in four sections, each dealing with a major market for sales of electricity. Each section has its own chairman who directs its operations, under the guidance of Mr. Restofski. A number of committees function within each section, on problems and in fields assigned to them by the section chairman. Two independent committees, covering matters of interest to all markets, the Wiring and Specifications Committee and the Sales Personnel and Training Committee, report directly to the Division Chairman.

COMMERCIAL SALES SECTION

The Commercial Sales Section, with C. A. STEVENS of the Public Service Electric & Gas Company, Newark, N. J., serving as Chairman, has its four committees primed for intensive activity on present applications in the commercial cooking, lighting and street lighting fields. The analysis and development of new uses of electricity for all commercial markets will also be stressed during the current year.

C. A. STEVENS

Chairman of the Commercial Sales Section—Sales Manager, Electric Dept., Public Service Electric & Gas Co., Newark, N. J.

Commercial Cooking Committee

The Commercial Cooking Committee, led by Chairman LUTHER T. CALE of the Birmingham Electric Company, Birmingham, Ala., will make every effort to intensify industry-wide support and promotion of this important service.

In addition the committee will prepare planned commercial cooking programs, suggested kitchen layouts for most efficient use of equipment, competitive service studies, articles for trade publications, case histories of successful electric company promotional programs and other data that will help utility sales managers to reach this market effectively.

Commercial Lighting Committee

The Commercial Lighting Committee, headed by Chairman C. D. HOLLISTER of the New York Power and Light Corporation, Albany, N. Y., will continue to encourage and expand the use of the industry's Planned Lighting Program in the store, office and school markets.

Consideration is also being given to new Planned Lighting promotional activities, with direct mail campaigns aimed specifically at school, office and gas station lighting prospects now in the planning stages.

LUTHER T. CALE

Chairman of the Commercial Cooking Committee — Commercial Sales Manager, Birmingham Electric Co., Birmingham, Ala.

C. D. HOLLISTER

Chairman of the Commercial Lighting Committee — Lighting Adviser, New York Power & Light Corp., Albany, N. Y.

The committee plans to make available to the industry's lighting sales staffs Kodachrome slides of outstanding commercial lighting installations, together with slide viewers, which can be used effectively in customer contacts.

Studies and reports are tentatively planned on many technical phases of light sources and equipment.

Market Development and Electrical Applications Committee

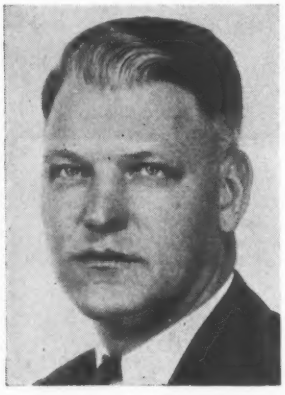
The newly organized Market Development and Electrical Applications Committee, a consolidation of the former Market Development Committee and the Commercial Heating and Motor Applications Committee, will be led by Chairman SYDNEY ALLING of the Rochester Gas and Electric Corporation, Rochester, N. Y.

SYDNEY ALLING

Chairman of the Market Development and Electrical Applications Committee—Manager, Industrial Dept., Rochester Gas & Electric Corp., Rochester, N. Y.

The committee plans to prepare and issue to the industry an expanded "Commercial Sales Log," which will carry articles and helpful information on promotional ideas, new techniques, demonstration equipment and case studies of electrical applications in all phases of the commercial market. This publication, it is planned, will serve as a clearinghouse for news of successful utility sales activities in this field. Several issues will be released during the year.

The committee will conduct study and research into new developments and improvements in present equipment, with germicidal lamps, electric heating and air conditioning, frozen foods and other commercial applications now being scheduled for investigation. Customer relations, sales research, servicing policies



G. E. KORTEN

Chairman of the Street Lighting Coordination Committee—Street Lighting Engineer, Consumers Power Co., Jackson, Mich.

and other important matters will also receive the committee's attention.

Street Lighting Coordination Committee

The Street Lighting Coordination Committee, with G. E. KORTEN of the Consumers Power Company, Jackson, Mich., serving as Chairman, plans to study the possibilities of further standardization of street lighting equipment, and will cooperate with manufacturers, technical societies and other trade associations in projects in this field.

The development of a Planned Street Lighting Program, coordinated with the industry-wide Planned Lighting Program, will be considered by the committee. Case studies of effective street lighting promotional campaigns employed by electric companies will be compiled and made available to member companies, together with technical data.

J. C. CAHILL

Chairman of the Farm Section —Farm Service Coordinator, The Detroit Edison Co., Detroit, Mich.

FARM SECTION

The Farm Section, supervised by Chairman J. C. CAHILL of The Detroit Edison Company, Detroit, Mich., has scheduled a busy year for its two committees, and has also planned several important activities to be carried through as section projects. Among these are the preparation of several additional sections of the "Farm Electrification Manual," which is used by electric company rural representatives; revision of the "In-Service Training Guide for Agricultural Workers," and encouragement of rural youth activities by member companies.

Agricultural Development Committee

The Agricultural Development Committee, headed by Chairman FRED M. SHAW of the Texas Power & Light Company, Dallas, Texas, will distribute to the industry on a monthly basis, de-

FRED M. SHAW

Chairman of the Agricultural Development Committee—Conservationist, Texas Power & Light Co., Dallas, Tex.

scriptions of agricultural development programs sponsored by electric companies, and will make recommendations designed to aid companies planning to engage in this activity.

How electric companies can best cooperate with the soil conservation programs of state and local authorities is another important subject to be studied by the committee. Methods for exchange of tested ideas and descriptions of successful agricultural development programs will be set up. The committee will encourage coordinated activities by electric companies, civic organizations and other agencies that are designed to improve farming standards and farm living conditions.

Farm Utilization Committee

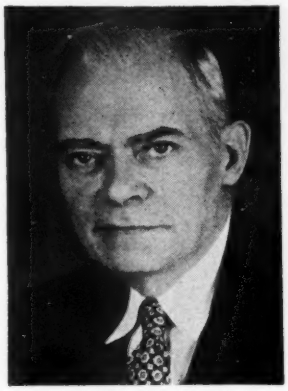
The Farm Utilization Committee,

JOHN L. BURGAN

Chairman of the Farm Utilization Committee — Director of Rural Development, New York State Electric & Gas Corp., Ithaca, N. Y.

under Chairman JOHN L. BURGAN of the New York State Electric & Gas Corporation, Ithaca, N. Y., will soon release a customer booklet on farm lighting, which has been prepared as a part of the Planned Lighting Program and is expected to prove highly effective in promoting the use of adequate light in farm buildings.

A handbook on farm electrification, which will present selected data and information on this subject in a convenient form for agricultural workers, will be prepared by the committee during the current year. State and national farm electrification research programs will be aided by the committee, which will also devote time to the problem of better adapting the design and specifications of electrical equipment to the needs of the farmer.



J. R. HARTMAN

Chairman of the Industrial Power and Heating Section — Vice President, The Cincinnati Gas & Electric Co., Cincinnati, Ohio.

Cooperation with the Electric Water Systems Council and other trade organizations will be stressed by the committee.

INDUSTRIAL POWER AND HEATING SECTION

The Industrial Power and Heating Section, with J. R. HARTMAN of The Cincinnati Gas & Electric Company, Cincinnati, Ohio, as Chairman, and R. G. ELY, Public Service Electric & Gas Company, Newark, N. J., as Vice Chairman, is composed of three main committees and several subcommittees.

While the individual committees operate within specified fields of activity, the section meets as a whole to the end that the best thinking of the industry may be devoted to major problems facing the industrial power and heating sales engineer.

THOMAS BURNS

Chairman of the Competitive Service Committee — Executive Engineer, American Gas & Electric Service Corp., New York, N. Y.

Competitive Service Committee

The Competitive Service Committee, directed by Chairman THOMAS BURNS of the American Gas & Electric Service Corporation, New York, N. Y., plans to prepare a supplement to Section IX of the POWER SALES MANUAL, entitled "Competition—Steam Engine and Turbine." This supplement will outline methods which can be employed to reduce the requirements of steam in industrial plants, and so reduce competition from power generated in supplying low pressure steam.

Information will be collected and disseminated on the cost of generating equipment. The committee will give particular attention to new developments in the gas turbine.

General Power and Heating Committee

The General Power and Heating

W. T. RICHARDS

Chairman of the General Power and Heating Committee—Industrial Sales Manager, Indianapolis Power & Light Co., Indianapolis, Ind.

Committee, with W. T. RICHARDS of the Indianapolis Power & Light Company, Indianapolis, Ind., as Chairman, will study and report to member companies on new developments in the use of electric power in industry, including new equipment and processes, as well as new uses for established processes and equipment.

A revised and expanded section on "Dielectric Heating" is now being prepared for the POWER SALES MANUAL, as are revised sections on "Industrial Refrigeration" and "Industrial Wiring." A subcommittee has completed a preliminary study of utility industrial development programs, and plans to prepare a revised section for the POWER SALES MANUAL, which will include the latest thinking on this subject.

MAXWELL COLE

Chairman of the Industrial Lighting Committee—Manager, Market Studies and Service Division, Philadelphia Electric Co., Philadelphia, Pa.

R. H. REHRER

Chairman of the Dealer Coordination Committee—Residential Sales Manager, New Jersey Power & Light Co., Dover, N. J.

T. O. McQUISTON

Chairman of the Electric Kitchen and Laundry Committee—Director, Residential Promotion, Duquesne Light Co., Pittsburgh, Pa.

TOM D. FULFORD

Chairman of the Electric Water Heating Committee — General Sales Manager, Virginia Electric & Power Co., Richmond, Va.

The committee plans to study the activities of electric companies in the field of market analysis, and will issue a report of its findings to the industry.

Industrial Lighting Committee

The Industrial Lighting Committee, led by Chairman MAXWELL COLE of the Philadelphia Electric Company, Philadelphia, Pa., will continue to promote the use of the Planned Lighting Program for Industry, and will consider the possible expansion of the scope of this program, based upon the experience of companies now actively promoting planned industrial lighting.

The committee will inquire into the need for another industrial lighting training program for electric company lighting representatives, similar to that held at Nela Park in May, 1948, and will make arrangements for the program if the need is found to exist.

Market opportunities for higher levels of lighting in industrial plants, improved sales methods in industrial lighting and the compilation of case histories of successful sales activities in this field are other important subjects to be considered by the committee.

RESIDENTIAL SECTION

The Residential Section, supervised by Chairman H. A. STROUD of the Monongahela Power Company, Fairmont, W. Va., is preparing to assist member companies with promotional programs, sales tools, market data and other materials for use in every part of the residential market. Six committees are now functioning in this section, with all agenda crowded with important projects.

Dealer Coordination Committee

The Dealer Coordination Committee, led by Chairman R. H. REHRER of the New Jersey Power and Light Company, Dover, N. J., will continue to expand its manual of "Ideas for Dealer Cooperation." The manual is prepared in section form, with each section presenting several tested methods used by electric companies in securing dealer cooperation in promotion of residential appliances.

"Lighting," "Electrical Bed Coverings," "Electric Ranges" and "Selection of Personnel for Dealer Coordination Activities" are among the subjects so far discussed. To be covered in future sections are such topics as "Dealer Cooperation for Promotion of Electrical Gifts," "Dealer Cooperation and Home Service," and cooperative promotional ideas for "Electric Water Heating."

H. A. STROUD

Chairman of the Residential Section — Promotion Manager, Monongahela Power Co., Fairmont, W. Va.

As a continuing project, the committee will serve as a clearinghouse for information on all phases of dealer cooperation.

Electric Kitchen and Laundry Committee

The Electric Kitchen and Laundry Committee, with T. O. McQUISTON of the Duquesne Light Company, Pittsburgh, Pa., serving as Chairman, is now putting the final touches on the most extensive promotional program on all-electric kitchens ever offered in this field by EEI. The program is spearheaded by a 40-page, full-color customer booklet, the "Kitchenizer's Digest," in which nationally known authorities will present helpful information on the electric kitchen and its appliances for the benefit of homemakers. Newspaper ads with an entirely new and effective appeal, direct mail, display ideas and many other selling tools are included.

A full-color motion picture on kitchens and kitchen planning will feature the program, which will be released to the industry in the near future.

Electric Water Heating Committee

The Electric Water Heating Committee, with TOM D. FULFORD of the Virginia Electric and Power Company, Richmond, Va., serving as Chairman, plans to capitalize on the experimental and engineering work done on this appliance in the past, and will devote much of its time to consideration of promotional aspects.

The committee will cooperate with the Electric Kitchen and Laundry Committee by submitting water heater sales suggestions for use in the promotional materials being prepared in the kitchen

program. A survey of the present degree of standardization of electric water heating equipment and practices among electric utilities is being prepared by the committee, and should be released within the near future.

Home Service Committee

The Home Service Committee, headed by MISS LUCILE JOHNSON of the Public Service Company of Oklahoma, Tulsa, Okla., plans to continue with its series of regional meetings for electric company home service personnel. The conferences sponsored thus far by the committee have proved to be effective media for interchange of home service ideas and for spreading knowledge of the latest home economics techniques.

The committee plans to study the possibility of expanding these regional meetings, and of inviting manufacturers to present demonstrations of their latest appliances.

MISS LUCILE JOHNSON

Chairman of the Home Service Committee—Director of Home Service, Public Service Co. of Oklahoma, Tulsa, Okla.

The "Home Service Exchange," a bulletin of home service news and information published by the committee, will be continued during the year with a total of six issues now being scheduled. The "Exchange" is distributed to home service directors of member companies.

Residential Lighting Committee

The Residential Lighting Committee, led by C. B. HELLMAN of the Consolidated Gas Electric Light and Power Company of Baltimore, Md., will continue to expand the Planned Lighting Program for homes. Several new promotional booklets, folders and direct mail pieces have just been released by the committee, and other aids are now being planned.

C. B. HELLMAN

Chairman of the Residential Lighting Committee — Residential Sales Manager, Consolidated Gas Electric Light & Power Co. of Baltimore, Md.

The possibilities of industry-wide promotion of the "Sunshine Home," embodying the latest principles of better light for better sight, and the "Sunshine Shop," which will be designed for dramatic display of modern lighting fixtures and lamps, will be investigated by the committee, and recommendations for appropriate action developed.

The committee plans to study the experiences of electric companies in the promotion of planned residential lighting, and will make recommendations, based upon the facts obtained, designed to increase the effectiveness of this program.

Television Committee

The recently organized Television Committee, headed by Chairman FRANK C. PESVEYC of the Public Service Electric and Gas Company, Newark, N. J., plans to study the effect of widespread use of television upon load conditions, and has already begun a survey of the experience of those companies now having a proportionately large number of television receivers on their lines.

FRANK C. PESVEYC

Chairman of the Television Committee — Sales Promotion Manager, Public Service Electric & Gas Co., Newark, N. J.

Among other questions to be analyzed by the committee are the possibilities for use of television as a sales medium by the electric company, and methods through which the company can best cooperate in stimulating the sale of receivers.

The need for customer education on the necessity for continued illumination for rooms in which television sets are operating will also be considered by the committee.

WIRING AND SPECIFICATIONS COMMITTEE

The Wiring and Specifications Committee, F. E. DAVIS, The Commonwealth & Southern Corporation, Jackson, Mich., Chairman, plans to continue expanding its "Appliance Wiring Manual," which illustrates and describes widely used methods for installation of major electric appliances. Sections on the electric range and home laundry equipment will be prepared, in a form similar to the already issued section on electric water heaters.

F. E. DAVIS

Chairman of the Wiring and Specifications Committee—Meter Engineer, The Commonwealth & Southern Corp., Jackson, Mich.

Commercial building wiring and rewiring; circuit breaker promotional activities; sole use of the National Electrical Code as the safety standard for electrical wiring, rather than special local codes; the use of 3-wire branch circuits and minimum service entrance wiring requirements will all receive the atten-

tion of this committee during the year.

Appliance testing specifications are now being formulated by a committee of the A. S. A., and the development of such specifications will be followed with interest by the committee.

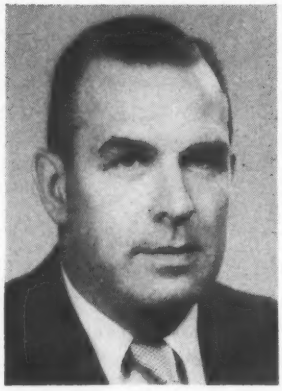
Illustrated talks on residential and commercial wiring for customer groups which were previously made available by this committee are now being revised, and should be ready in the near future. Special revision kits, which will bring up to date the slide sets and texts purchased by electric companies in the past will be made available at nominal cost.

SALES PERSONNEL AND TRAINING COMMITTEE

The Sales Personnel and Training Committee, headed by Chairman E. O. GEORGE of The Detroit Edison Company, Detroit, Mich., plans to study the compensation plans for utility sales personnel now being used by electric companies, and to prepare a report on the operation of different plans, as a guide to utility sales departments. A review of methods employed to measure job performance of sales personnel will be included in the report.

A survey on the use and value of weighted application forms and aptitude tests is another project on the committee's agenda, as is the preparation of a developmental program for sales supervisors.

A general information bulletin for utility employees, containing information designed to further the objectives of the sales department, is also being considered by the committee. Such a bulletin, it is believed, could well be designed to assist employees to answer the more common customers' questions on proper use of electricity, appliance advantages and other matters.



E. O. GEORGE

Chairman of the Sales Personnel and Training Committee—Assistant Commercial Manager, The Detroit Edison Co., Detroit, Mich.

RALPH P. WAGNER

Chairman of the Better Light Better Sight Bureau—Commercial Manager, New York Power & Light Corp., Albany, N. Y.

BETTER LIGHT BETTER SIGHT BUREAU

The Better Light Better Sight Bureau, organized in 1933 and the oldest cooperative educational agency in the electrical industry, is now led by Chairman Ralph P. Wagner, of the New York Power & Light Corporation, Albany, N. Y. The Bureau is organized into two operating committees, the Commercial and Industrial Education Committee, with J. S. Schuchert, of the Duquesne Light Company, Pittsburgh, Pa., serving as Chairman, and the Home Lighting Education Committee, with Chairman J. M. Stedman, of the Pennsylvania Power and Light Company, Allentown, Pa.

These committees conduct continuous research into the lighting educational activities of electric utility companies, supplying suggestions designed to expand and intensify these programs, and recommending the production of educational aids to be made available to utilities.

During the current year, the Bureau will continue to prepare educational booklets, folders and other aids that will play an important part in the industry-wide Planned Lighting Program. The Bureau's latest project, a teaching program on the relationship of light and sight for elementary school classes, is meeting with an enthusiastic reception, and plans are being made to expand the scope of this activity.

Third National Farm Electrification Conference To Meet in Chicago, Nov. 17-19

THE spotlight will be focused on "meeting the farm family's needs electrically" when top level executives of agriculture, industry, merchandising, research and education assemble in the Congress Hotel, Chicago, Nov. 17, 18 and 19, to attend the third annual National Farm Electrification Conference.

Only nation-wide event of its kind, the Conference will be attended by approximately 500 persons. Not a convention in any sense of the word, the annual meeting is a "work shop" of ideas and plans of action, all of which are aimed at directly benefiting the farm family and agriculture.

The program, under direction of George A. Rietz of Schenectady, N. Y., Manager of the Farm Industry Division, Industrial Divisions, General Electric Company, will feature addresses by several of the nation's outstanding farm electrification leaders and panel discussions devoted to a number of the most difficult problems faced today in putting electricity to maximum use on the production front and in the farm home.

Frank E. Watts of New York City, Executive Assistant of *Farm Journal, Inc.*, Chairman of the Conference, will set the course for the program in convening the first day's session. The address of welcome—The Place of Extension Service and Agricultural Colleges in Farm Electrification—will be delivered by H. P. Rusk, Dean of the College of Agriculture, University of Illinois.

Headline speakers will include John Strohm, Associate Editor of *Country Gentleman*, who will deliver his first talk in this country after an extensive

(*Continued on page* 356)

The Electric Industry's Progress in Wisconsin

By W. E. Schubert
President, Wisconsin-Michigan Power Company

An address presented before the Wisconsin Utilities Association Accounting Section Conference at Delavan, Wis., September 30, 1948

NOT long ago an important executive in the electrical industry spoke as follows:

"There are fewer distinctions—between rich people and poor people—in the U.S. than in any country in the world. Where once only the rich could afford candles at night, today the finest lamps that money can buy and science can produce cost only a few cents and are available to all. Rich men—the few that remain—can buy no better refrigeration and washing machines and telephones and plumbing and transportation than are available to everybody.

High Standards

"Who has been more successful than the average American in his quest for economic betterment, social progress, and political freedom? Who produces more of the world's goods and enjoys more of the benefits than we do? Who is more his own master? Yes, the U.S. is the standout political success of all time. That sounds like extravagant language, but we know it is a solid unvarnished fact in the modern world."

Our industry perhaps did not create the high standards of living which we today enjoy, but it helped in a substantial way to make possible the necessary production on a scale and at costs that have brought Americans to the level described by C. E. Wilson, president of General Electric Co., in the foregoing statement.

There are before me two photostatic copies of account sheets taken from the books of one of our predecessor companies which operated as a central station utility back in the 1880's. These two pages are of great interest when considered in the light of present day knowledge. One account shows the name of Augustus Ledyard Smith, banker and financier. The other is in the name of George F. Peabody, principal owner and officer of the Pettibone Peabody Company. Both men were reputed to be wealthy by all standards of measurement and fell into the group that could secure luxuries of the 80's and pay for them without subsequent worry about the next income tax installment. Mr. Smith is reputed to have smoked fifty-cent cigars before the turn of the century, and his home, which has recently been torn down to make way for college expansion, was reported to have had the finest and largest private library in the Fox River Valley. During the year 1889 Mr. Smith paid for approximately 795 kwhr, delivered to his home for the sole purpose of providing illumination, a gross amount of $158.90. Mr. George Peabody, during the same year, paid for approximately 343 kwhr a gross amount of $68.65. The average rate at which electricity was billed these two accounts during 1889 was 20¢ per kwhr which, in terms of today's dollar, would have been about 70¢ per kwhr.

I have before me the electrical consumption data for two customers for the year 1947. Neither of these is in the financial classification of Messrs. Smith and Peabody. Neither one of the two smokes 50¢ cigars; in fact one of them smokes a pipe and the other is cutting down on his cigarettes because of high taxes. These two customers live in much smaller homes than were occupied by either of the two gentlemen in 1889. Collectively they use electricity for forty-two specific jobs within and about their respective homes. The first, during the year 1947, consumed 6520 kwhr for which he paid $139.32, and the second one used 3790 kwhr for which he paid $91.55.

Economy and Accounting Progress

The average rate per kwhr for energy to these two consumers for the year 1947 was 2.2¢. This figure, when considered in the light of dollar values, compares with the price of 70¢ per kwhr which Messrs. Smith and Peabody paid in 1889. If the money standard of 1889 be applied, the figure of 2.2¢ would drop to slightly under 0.7¢. I have tried for weeks to find a single item on any commodity list which can show a comparable record when viewed from purely the standpoint of economics.

A second point of interest concerning the account sheets warrants mention in passing. It relates to accounting progress that has been made in our industry since before the turn of the century. One glance at the very involved sheets and all the opportunities for mistakes will indicate that the accountant in our business has advanced with the years probably just as much as, or even more than, the contemporary technician but with less glamour and without being so much in the public eye. The accountants are deserving of much credit for having developed with the industry and in many respects having had the foresight to prepare for things that were finally to follow, thus paving the way for simplification, accuracy, and ease of auditing.

Meters Are Our Cash Registers

A third interesting factor indicated by the two ledger sheets concerns the development of facilities for giving good electrical service and being able to measure and bill for such service with a fair degree of accuracy. After all, meters are our cash registers. In 1889 electricity was measured in terms of milligrams. Electrolytic meters were then considered the most modern device for measurement of electricity. This type of meter was comprised of two jars which contained an electrolytic solution. Immersed in the solution were four plates, two on the positive side and two on the negative side, with pairs arranged in parallel. The plates were carefully weighed by means of a chemical balance when installed and again a month later when removed to ascertain the gains and losses.

These gains and losses were then converted into units of electricity. One milligram hour was equal to about 85 watt-hours. One gram of electricity was worth $17.74. For easy calculation, I might add that one gram in those days was considered as being equivalent to the weight of a new dime. During the winter months it was necessary to install

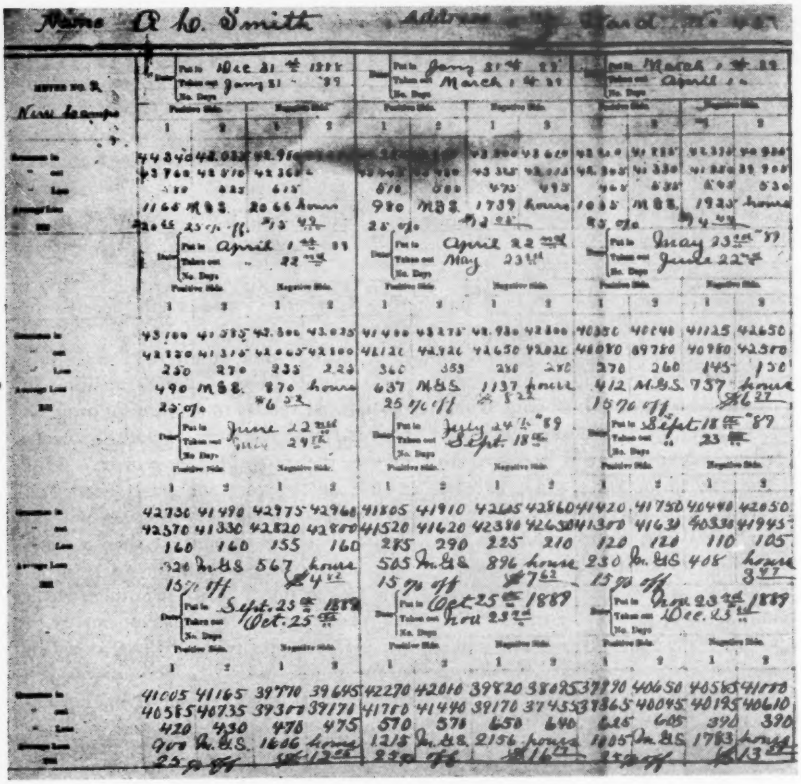


Fig. 1—Photostatic Copy of the Yearly Account of Augustus Ledyard Smith, 1889

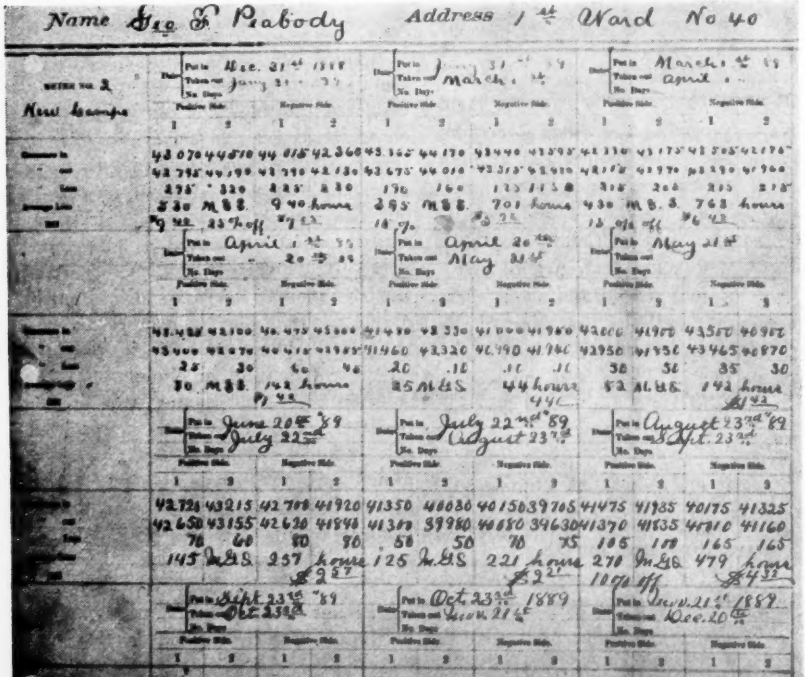


Fig. 2—Photostatic Copy of the Yearly Account of George F. Peabody, 1889

within the meter box a 10-candlepower carbon lamp so as to keep the electrolyte from freezing. This lamp consumed an appreciable amount of energy during each month of the winter and accounted for a substantial item in the power company's unaccounted for electricity statistics.

When one looks at the relatively simple bearingless, single-phase meter recently put on the market, there is a quick visual parade of the industry's progress. It reveals another one of the reasons why most Americans can today secure better electrical service than Messrs. Smith and Peabody, at one-tenth the cost.

In the days of the electrolytic meter, a meterman working twelve hours per day considered himself as having accomplished an average day's work if he read from 6 to 7 electric meters. In the same community today, with single family dwellings, a meterman, paid on a portal to portal basis for an eight-hour day, reads approximately 300 meters. Here is another story of progress in our industry.

Equally remarkable is the progress shown in the consuming end of our business. Customers, both residential and rural, are still being added at a record rate. We are, however, reaching, or at least approaching, saturation so far as existing establishments in Wisconsin are concerned. Having reached saturation, we must depend upon population growth for further customer expansion.

So far as concerns loads, it is reasonable to assume that within relatively few years the farmer will double his consumption and the residential consumption will continue upward at a very rapid rate. New concepts and ideas of health, comfort, and convenience will require greater and greater use of electricity. Added emphasis will be given by the fact that domestic help has become prohibitive in cost.

In discussing commercial and industrial loads, I wish to call your attention first to a tabulation* which was given to this Association earlier during the year. It shows the relationship of horsepower capacity per American worker as against time for a half century.

1848—Very little Hp.
1879—1.3 Hp.
1909—2.9 "
1929—4.9 "
1939—6.4 "
1947—7.2 "

* *Mechanical Engineering*, May, 1948, p. 449, F. R. Benedict, Westinghouse Electric Corp.

As seen in Fig. 3, for 1909, only 0.9 hp or 31 per cent of the total of 2.9 hp was electrical whereas in 1947, 6.7 hp or 93 per cent of the total of 7.2 hp was electrical. We are all aware of what is happening to the remaining 7 per cent.

I next call your attention to the wartime kilowatthour peak of 2,993,123,000 kwhr for industrial and commercial loads which occurred during the year 1944. Following that year the energy load for this class of service dropped and the 1944 wartime kilowatthour peak was not passed until 1947, for which the total was 3,012,978,000 kwhr. (See Fig. 4). Note that the increase of '47 over '44 is very slight. This therefore means, in effect, that the year 1948 is building up to a new kilowatthour level. Important to us is the fact that the kilowatthour leveling off process did not occur in the capacity demand per American worker. It is reasonable, therefore, to suppose that the leveling off in kilowatthours merely reflects a temporary condition related to the end of the war, to post-war readjustments, and the supply of raw materials.

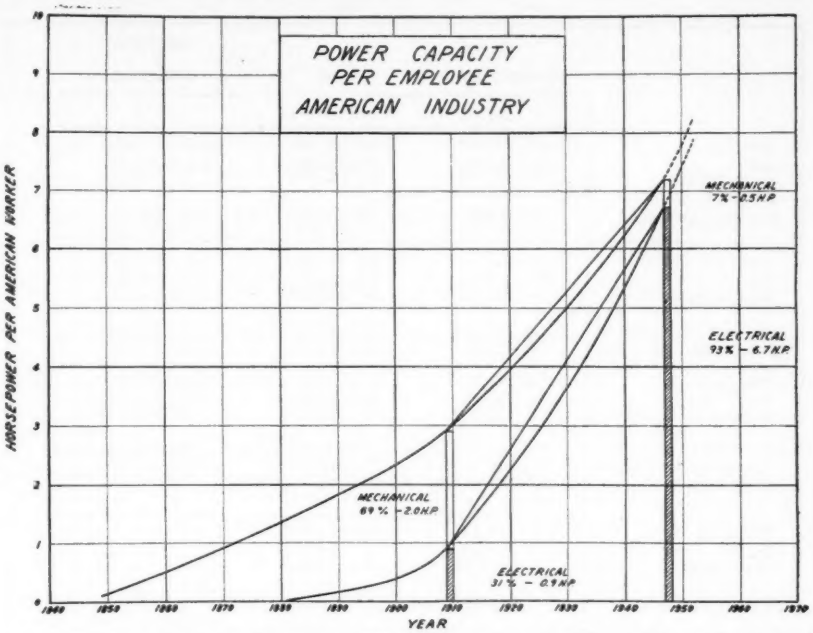


Fig. 3—Graph of the Growth of Horsepower Per American Worker and the Increasing Ratio of Electrical over Mechanical Horsepower in American Industry

Best Single Bargain

As of the current year many industrial plant additions, new plants, and new processes have been made effective and more kilowatthours are being poured into each ton of paper, each ton of ore, each unit of machinery, and each gallon of ice cream, and there is reason to believe that this trend will continue upward in the face of mounting costs of labor. Electricity has become industry's best single bargain. Account must also be taken of loads that will come from further new applications of electricity in commercial and industrial processes.

At the North Central Electric Association meeting at Breezy Point, Minnesota, Mr. Hibbard of Duluth spoke of some new and substantial electrical demands that were being made of his company because of a new process that is being developed in iron ore production. This new process will send to the markets via existing transport facilities greater iron tonnage than is presently possible. By the use of electricity a primary reduction at the mine will result in a uniform shot-like pellet of 60 to 65 per cent iron content. These uniform pellets with the higher iron content can be more compactly transported than the bulk ores are at the present time.

There will also be economies resulting at the blast furnace end. Cintering may solve a bottleneck in ore transportation similar to one that our own industry is working into. As an illustration, if in Wisconsin during the next decade our electrical load is doubled, two and a half million more tons of coal will have to be brought into this state. That means 125,000 rail cars, and if the coal travels by water, the equivalent of about 250 lake colliers. It, of course, means more miners to work the mines and more mines to be worked.

In the state of Wisconsin the electric utility picture is approximately as follows. Seventy-six per cent of the 5,319,755,000 kwhr generated in 1947 came from steam-plant sources. Approximately 22½ per cent were hydro produced, and the balance of about 1.5 per cent from miscellaneous other sources, principally oil engine. It should be noted that the ratio of hydro power to the total has been steadily declining, and there is reason to feel that the trend will continue even though additional hydro projects are under way presently. There is no doubt that within the state we are rapidly approaching saturation so far as hydroelectric production is concerned.

The output of Wisconsin electricity is divided roughly as follows:

60 to 70%—Industry and Commerce
20 to 25%—Residences
5 to 10%—Farms
About 5%—Other Uses

Wisconsin electric generation from the year 1938 through 1947 increased from 2,658,200,000 kwhr to 5,319,755,000 kwhr, a total of 2,661,555,000 kwhr, or 100 per cent increase. It is reasonable to suppose that unless some major catastrophe befalls us within the decade following the year 1947, we will have more than doubled the 1947 load by 1957. This means that our program of planning for the future will have to be on a very much revised basis from that of the past. Distribution for residential and rural services will very definitely have to be given a "new look." (See Fig. 5.)

Load Vs. Capacity

We now arrive at the currently active subject of "Load Versus Capacity." Unfortunately a number of factors, all of them adverse, have been working against us.

The first of these factors results from the inability to secure and install generating facilities during war years and thus losing a safe margin of spare capacity for load growth and normal maintenance. At the close of the war manufacturing plant conversions, material shortages, and labor troubles delayed the production of much needed electric generating capacity, some of which is now only in the installation stage and not yet available for production of electricity. Meanwhile, demands for all classes of electric

	RESIDENTIAL	RURAL	COMMERCIAL & INDUSTRIAL
	Kilowatthours		
1947	1,089,154,000	268,327,000	3,012,978,000
1938	500,231,000	69,631,000	1,311,749,000
10-yr Increase	588,923,000	198,696,000	1,701,229,000
Per cent Increase	588,923,000 / 500,231,000 = 118%	198,696,000 / 69,631,000 = 285%	1,701,229,000 / 1,311,749,000 = 130%
1947	1,089,154,000	268,327,000	3,012,978,000
1943	751,160,000	132,170,000	2,833,690,000
5-yr Increase	337,994,000	136,157,000	179,288,000*
Per cent of 10-yr Increase in last 5 yrs	337,994,000 / 588,923,000 = 57%	136,157,000 / 198,696,000 = 69%	179,288,000 / 1,701,229,000 = 11%
1947	1,089,154,000	268,327,000	3,012,978,000
1946	968,359,000	220,638,000	2,679,172,000
Increase last year	120,795,000	47,689,000	333,806,000*
Per cent of 10-yr Increase in last year	120,795,000 / 588,923,000 = 21%	47,689,000 / 198,696,000 = 24%	333,806,000 / 1,701,229,000 = 20%
	Number of Accounts		
1947	664,933	113,204	
1938	545,853	63,270	
10-yr Increase	119,080	49,934	
Per cent Increase	119,080 / 545,853 = 22%	49,934 / 63,270 = 79%	Commercial and industrial accounts grew in number from 108,369 in 1938 to 115,090 in 1947 with a low of 103,742 (due to the war) being reached during 1943
1947	664,933	113,204	
1943	611,291	82,483	
5-yr Increase	53,642	30,721	
Per cent of 10-yr Increase in last 5 yrs	53,642 / 119,080 = 45%	30,721 / 49,934 = 62%	
1947	664,933	113,204	
1946	640,952	103,676	
Increase last year	23,981	9,528	
Per cent of 10-yr Increase in last year	23,981 / 119,080 = 20%	9,528 / 49,934 = 19%	

* These data on commercial and industrial consumption are not significant unless used in connection with full data for 10 years. The kwhr peak was reached during 1944 with a recession during the next two years. A new kwhr peak was established in 1947.

Fig. 4—Table Showing the Proportionate Increase of Residential, Rural and Industrial Load and Number of Customers in Wisconsin in the Ten-Year Period 1938-47

service, and more particularly residential and rural, have mounted at unprecedented rates.

A second factor relates to the shortage of labor for construction. The backlog of construction which accumulated during the war years, plus the normal construction resumed after the war, created such a heavy demand for skilled as well as unskilled labor that the labor market could not supply the demand. There are still areas within our state where there are substantially more jobs than persons to fill them.

A third and very important factor is the loss of hydroelectric kilowatt capacity and kilowatthour production because of prevailing hydrological conditions in Wisconsin and neighboring states. In Wisconsin we are near, and in some locations below, the lowest flow records for important rivers. Sheds are extremely dry and subsoil water has reached surprisingly low levels. Artificial storage reservoirs, too, are well below the levels considered necessary for this time of the year.

The late months of 1947 reflected drought conditions which have continued in 1948 to date. During the year 1947, with only a few months being affected, Wisconsin hydroelectric generation dropped approximately 150,000,000 kwhr below 1946. From this shrinkage, you can get some idea of the magnitude of lost hydro production when it is considered that all months of 1948 to date can properly be classed as dry months.

Every possible effort is being made by the interconnected utilities of Wisconsin to guard against equipment failures, and it is interesting to note that the program of the Operating Committee of this Association has paid dividends in minimizing and arranging equipment outages in a manner least detrimental to the service of electric customers in the State of Wisconsin.

Wisconsin is indeed fortunate to have been so well advanced in power system interconnections when the war first brought unprecedented electric demands. Much credit for these system interconnections must go to the Public Service Commission of Wisconsin and the Wisconsin Utilities Association acting through its splendid Power Coordination Committee. This committee has been active for many years and still continues so. Besides its initial two-volume findings, it has added three supplements, the last of which was submitted to the Public Service Commission late last year.

I would like to give you a few general comments concerning the gas utilities situation in the State of Wisconsin, particularly as it relates to natural gas in the eastern half of the state. The information that I offer comes from a discussion by Mr. Dickeman of Michigan-Wisconsin Pipe Line Company. The pipe line which will bring natural gas in large volume into the State of Wisconsin is well under way and current progress indicates that by January of 1950 natural gas will probably be made available to utilities in the southern sections of the state whereas by July of the same year other areas will be supplied.

This, of course, does not mean that all of our gas problems will vanish by July 4 of that year, but it does mean that we will be in a position to undertake the next step of bringing natural gas to the consumers of our various gas systems. No doubt there will come with natural gas many related problems that are already being anticipated along with many that cannot be anticipated.

The Michigan-Wisconsin Pipe Line Company has a very interesting physical layout and one that will give that company unusual advantages not enjoyed by all pipe line companies. In the northeastern part of the Lower Peninsula of Michigan are substantial gas fields which have been exhausted to the point of minimum pressures required to keep the water from filling the fields. The pipe line which is being built from the Texas Panhandle will deliver gas directly to the underground gas fields of the Lower Michigan Peninsula. A branch line from a point in Illinois will deliver the Wisconsin requirements, and a line from the Michigan natural gas storage fields will take care of the Detroit requirements. During the light load months, it is proposed to pump all of the gas not needed

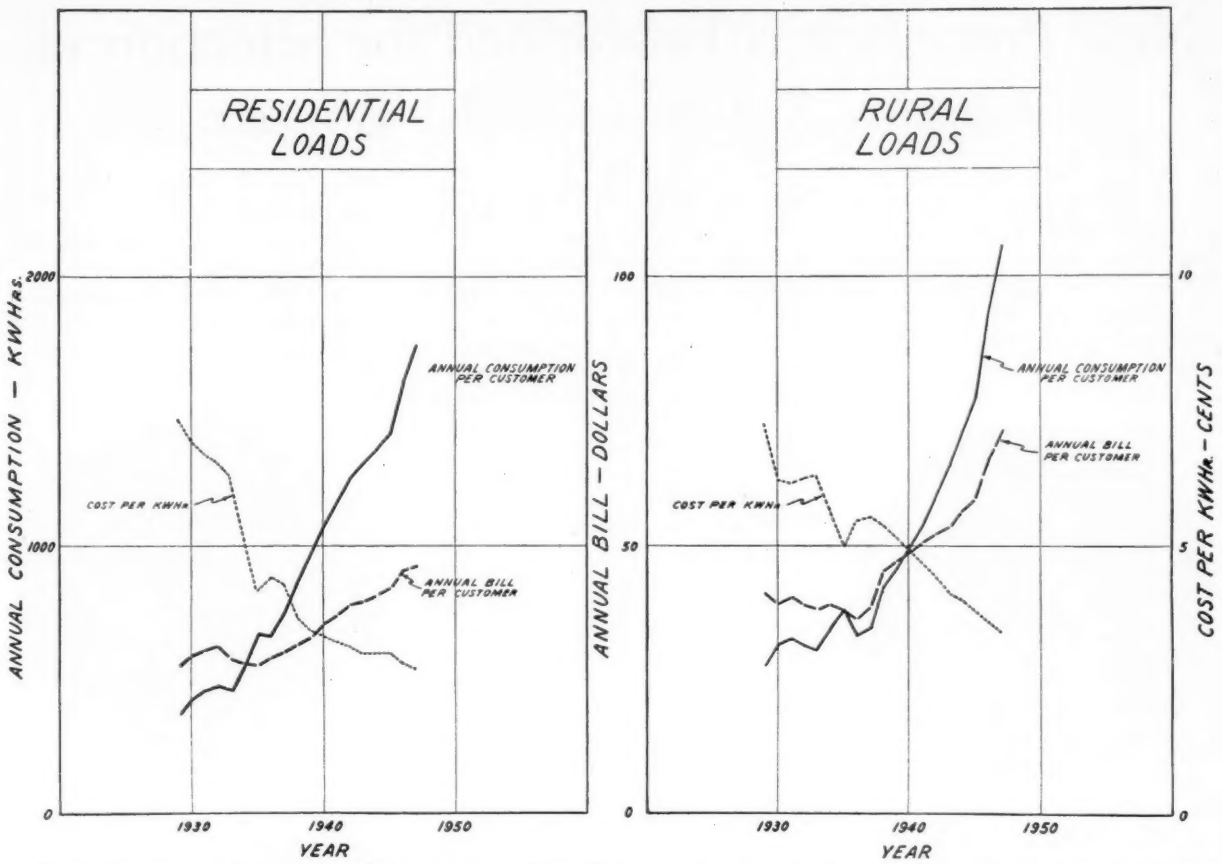


Fig. 5—Graphs of the Cost Per Kwhr, Average Annual Consumption and the Average Annual Bill for the Residential and Rural Market in Wisconsin

to carry loads into the so-called Austin Field where it will be stored under substantial pressures and held in reserve for wintertime peaks.

The Michigan-Wisconsin Pipe Line Company feels that it now has in the Austin Field a sufficient storage (delivered to it this year over the lines of the Panhandle Company) to avoid a recurrence of the crisis that occurred in Detroit last winter when thousands of workers were laid off, and great loss of industrial production resulted because of lack of gas.

You are well aware, as are all utility men, that during the next few years all utility companies must raise an unprecedented total of new capital. This need results from matters that I have already touched on and more particularly those relating to large utility plant additions for the purpose of bringing the loads and plant capacities into better relationship. At a recent conference Mr. L. F. Seybold, a former President of this Association, stated, "From reading the news concerning utilities, I have gained the impression that additions to utility plant in four years from 1948 through 1951 on the part of many companies will amount to nearly one-half of the book value of plant at the beginning of this period. For some it will be less, but for others even more. This results from the accumulated demand for new property and also from the fact that the unit cost of this new property is nearly twice as high as it was before the war."

To obtain the required cash for construction, our utilities must compete in a money market with numerous other industries which, like our own, have heavy demands for cash. Thus we find ourselves in a market of rising money costs and one that is largely dependent first upon a desire of individuals to save, and next a desire to invest those savings. Investors will be able to choose and select the best investments from among great numbers of opportunities afforded. Because this is true, it is extremely important that the credit status of utilities be kept strong. The question is, how can this be done?

As far as the growth of the business and the outlook for revenues are concerned, I am very optimistic. The question which bothers me most is whether such revenues will cover the rising operating expenses. In many instances, we have already found that it is impossible to absorb wholly the rapidly increasing operating costs and therefore many of us have been actively involved in an endeavor to get upward rate adjustments.

It is hoped that the regulatory commissions will grant prompt approval of rate adjustments where these are required to offset rapidly rising costs thus preserving the credit standing of utilities in the eyes of investors. If this is not done, there is grave danger that investors will shy away from buying utilities' securities, especially common stocks, because they will conclude that if money already invested in utility property is not permitted to earn a fair return, the chances of earning it on new capital may be even less.

It is hoped that all who may be engaged in the solution of the problem of adequate rates will carefully consider and heed this fundamental fact.

New Procedure is Established for Selection of Charles A. Coffin Medal Winners

SELECTION of the annual winner of the Charles A. Coffin Medal, established by the General Electric Company and emblematic of high achievement in the electric light and power industry, will take place hereafter

under a new procedure recently approved by the Charles A. Coffin Foundation, donor of the Award, and the Board of Directors of the Edison Electric Institute, it has been announced by Ernest R. Acker, President of the Institute.

Under the new procedure five companies, to be chosen through a nominating and reviewing process now being established, will be invited by the President of the Institute to compete for the Award. From these companies the Charles A. Coffin Award Committee will establish the winning company, after careful evaluation of the data relating to the accomplishments of the companies under consideration.

Formerly a general invitation to compete for the Award was given to all operating companies, leaving the initiative to compete in the hands of the companies, rather than with the nominating and reviewing groups, as in the new procedure.

The Nominating Panel and the Review Committee are the agencies being set up by the Institute to screen the nation's operating electric companies and to determine which, by virtue of their accomplishments during the contest year, shall be invited to submit entries for the Award.

The Nominating Panel consists of the Chairmen of thirteen Edison Electric Institute Committees, in addition to six members-at-large appointed by the President of the Institute from executives of electric companies which are past recipients of the Award. Each member of the Panel will submit, by December 15 of the contest year, the names of three electric operating companies, exclusive of his own company, which in his opinion have made some outstanding accomplishment or accomplishments in the contest year. The companies, and their achievements, will be listed in order of merit by the nominator, who, in general, will consider those fields of operations with which he is familiar.

Rating of the Panel nominations will be undertaken by the Review Committee, consisting of three members appointed by the President. Their judgment will be based on an evaluation of the number of nominations received by each company, the company's ranking in the individual nominators' lists, and the importance to the industry and the public of the accomplishment for which the company has been named.

Submission by the Review Committee of the names of the five highest companies on the rating list will be made to the President of the Institute not later than January 15th following the contest year, and the President will then invite the five companies to submit simple presentations for the Coffin Award.

Most coveted of the electric industry's recognitions of merit, the Charles A. Coffin Award was established twenty-seven years ago by the Charles A. Coffin Foundation to honor each year the electric company making "the greatest advancement in its operation and physical plant, thereby making a distinguished contribution to the development of electric light and power for the convenience of the public and the benefit of the industry."

Consisting of a gold medal for the winning company, and $1,000 for the employees' benefit fund, the Coffin Award has gained national recognition from the public as well as the industry for its significance as an acclamation for conscientious service and progressive development.

Signalizing specific accomplishments rather than general excellence, the Coffin Award may be given for important advances in any area of electric company

FOR DISTINGUISHED CONTRIBUTION
TO THE DEVELOPMENT OF ELECTRIC
LIGHT AND POWER FOR THE CONVEN
IENCE OF THE PUBLIC AND THE
BENEFIT OF THE INDUSTRY
AWARDED TO

operations. The make-up of the new Nominating Panel assures coverage of all fields, including as it does the Chairman of the following EEI Committees:

Engineering Division General Committee, Prime Movers Committee, Electrical Equipment Committee, Transmission and Distribution Committee, Commercial Division Executive Committee, Residential Section, Commercial Sales Section, Industrial Power and Heating Section, Farm Section, Accounting Division General Committee, Rate Research Committee, Industrial Relations Committee, Accident Prevention Committee.

Under the newly adopted procedure, the President of the Institute, in issuing the invitations to the five companies nominated for the competition, will indicate as a basis for the presentation the specific accomplishment for which the company has been cited. The entrant may, however, base its presentation to the Coffin Award Committee on some other achievement which the company might feel to be of greater significance than the accomplishment for which it was nominated.

As in the past, the winner will receive the Award in ceremonies held at the annual Convention of the Edison Electric Institute.

Suggested Field Test Procedure
for

Determination of Coefficient of Performance and Performance Factor of an Electric Heat Pump While Operating on the Heating Cycle

RECOMMENDED BY
JOINT AEIC-EEI HEAT PUMP COMMITTEE

A STANDARDIZED field test method for determining the Coefficient of Performance and Performance Factor of commercial heat-pump installations, devised and recommended by the Joint AEIC-EEI Heat Pump Committee, is outlined below. The procedure is intended to assist utility companies that are now making, or plan to make in the near future, performance tests under actual operating conditions. No attempt is made in the procedure to cover test methods on any heat sources. Ultimately, a heat pump test code acceptable to the industry will be prepared by the Joint ASRE-ASME Committee on Refrigerating Systems and the ASRE Committee on Standard Methods of Rating and Testing Air Conditioners.

A—Coefficient of Performance

Determination of the heating coefficient of performance (cp) is the most useful guide in judging the operation of a heat pump system. The term cp has been rather loosely used in the past, resulting in misunderstanding and confusion. Definitions adopted by the Joint AEIC-EEI Heat Pump Committee are as follows:

> "The heating coefficient of performance of an installed heat pump shall be the total useful heating effect produced by the heat pump system at stated conditions, divided by the heat equivalent of the total energy input to the system."
>
> "The term 'performance factor' shall be employed when referring to a value based on an extended period of time, stating the period of time covered."

An electric *heat pump* means a refrigerating compressor, its driving motor, and all heat exchanger equipment and connecting lines through which refrigerant is circulated. An electric *heat pump system* is a heat pump plus the necessary auxiliary equipment that uses electricity, for providing all-year air conditioning or heating service. *Useful heating effect* may be further clarified by reference to section E.

The denominator of the cp ratio is readily found. In the case of electrically operated heat pumps, it is the total electric input to all motors and auxiliaries in the system, expressed in kilowatts, multiplied by the conversion factor 3413. But the numerator of the ratio, *i.e.*, total heating effect produced, is not so easy to obtain, due to the difficulty of measuring the heat delivered.

There are several possible methods for determining the cp and the performance factor of a residential or small commercial heat-pump system. The air flow-temperature method and the liquid flow-temperature method offer two possibilities. The compressor-pressure method is universally applicable to all types of installations; therefore, this method of testing is recommended by the Joint Committee in order to obtain comparable test results.

B—Compressor-Pressure Method

The recommended procedure for field testing of all types of residential and small commercial heat pump systems requires manufacturer's data on compressor and motor characteristics, readings of refrigerant pressure, refrigerant temperature and measurement of electric power input.

For a compressor of given size and type, in good mechanical condition and operating at a known speed, the quantity of refrigerant handled depends only on the inlet vapor pressure and temperature, and on the outlet pressure. The saturated temperature corresponding to the outlet pressure, power required for compression, and the quantity of heat delivered to the condenser are thereby fixed, within the accuracy of the manufacturers' heat pump capacity data.

Data correlating the heat delivery with the operating conditions are readily found from performance rating or *calibration* charts, based on laboratory tests of typical compressors or on manufacturer's routine production-line tests of units prior to shipment. Efficiencies of motors of the types and sizes used in heat pump systems, and of the V-belt drives, are also closely determinable. Net power delivered to compressor shaft, obtained by applying these efficiencies to the measured electric input of motor, affords a check on compressor performance.

C—Field Testing Procedure

Measurements to be taken in field tests comprise:

a. Pressure of Refrigerant vapor at inlet and outlet of compressor.
b. Temperature at same points as in *a*.
c. Temperature of liquid refrigerant leaving condenser (heat delivery unit).
d. Electric power consumption of compressor motor.
e. Electric power consumption of auxiliary motors, controls, resistance heat, etc.
f. Compressor, rpm.

Tentative form for reporting field test data and performance figures is in Appendix A. Suggestions on instruments suitable for heat pump field tests are in Appendix B.

D—Calculations of Results

For each pressure value obtained in the test, saturated refrigerant tempera-

ture is found by reference to tables of properties of the refrigerant used. The degrees of superheat of entering vapor and subcooling of liquid leaving condenser are obtained by subtraction from observed temperatures. On manufacturer's performance rating chart for the particular compressor and operating speed, the refrigeration capacity in Btu per hour is then found for the combination of suction and discharge pressures. Correction of this value is made for superheat of entering vapor, at percentage rate named on chart; similarly, correction is applied for subcooling of liquid leaving condenser. A suggested standardized form for manufacturer's compressor rating is discussed in Appendix C.

The heat quantity thus determined is the refrigerating effect, *i.e.,* the quantity contributed by the heat source. To this is added the heat equivalent of electric input to the compressor motor. If system is so arranged that heat from the motor, compressor, and drive losses is not usefully absorbed, deduction is necessary from this total for the unabsorbed losses. Further addition is made for that portion of auxiliary power which goes into useful heat.

This test procedure is predicated upon an all-electric heat pump system. It is recognized that supplementary heat may be furnished and this energy input and the useful heat would have to be determined. If supplementary heat is employed in conjunction with the heat pump system, the type and extent of use should be clearly noted.

The total heating effect and the heat equivalent of the total energy input are then used as indicated in section A to obtain the coefficient of performance or the performance factor.

The majority of compressor rating charts are based on 65 F suction temperature and no liquid subcooling. For heat pump systems having gas-liquid heat exchangers a suitable correction factor must be employed. The capacity of a system is reduced approximately 0.8 per cent for each 10 degrees F that the suction gas temperature entering compressor is below 65 F. The capacity of a system is increased approximately 4.5 per cent for each 10 degrees of liquid subcooling.

E—Heat from Auxiliaries

For residential and small commercial heat pump systems, auxiliary power is used in blowers and pumps that circulate outdoor air and liquid (as heat sources), and indoor air and liquid (for heat delivery). The net shaft power produces velocity and overcomes frictional resistance—both ultimately converted into heat. Whether this heat is additive to the quantity indicated by compressor operating conditions and performance rating values, depends on arrangement of system; disposition of losses in the motors is similarly determined.

With heat-source blowers or pumps, the shaft power that is converted to heat acts as a supplement to, or replacement of, the thermal source. For example, the frictional resistance to liquid flow within a heat exchanger acts to warm the fluid and has the same qualitative effect on heat transfer as if the fluid had entered at slightly higher temperature. Refrigerant pressure and temperature at compressor inlet fully account for this contributed heat, and net power put into the pump for working against frictional resistance to flow is not additive to the compressor capacity rating.

The power consumed by blowers and pumps handling air or water which conveys heat to the point of utilization is completely converted into heat through friction, turbulence and dissipation of velocity energy. In this case, the heat equivalent of net shaft power for blower or pump is additive.

Auxiliary motor losses contribute to useful heating effect in the following cases:

1. Motors located directly within the heated space.
2. Motors located in apparatus room or housing from which air is discharged to the heated space.

Where the motors of hermetically sealed compressor units are cooled by refrigerant vapor, the heat contributed by motor losses affects refrigerant pressure and temperature readings; therefore, the losses should not be added in computing total useful output.

APPENDIX A

A questionnaire prepared by the Joint AEIC-EEI Heat Pump Committee to obtain installation and field test data on heat pump systems is shown in Figs 1, 2 & 3. Data for this form may be obtained by test methods outlined below.

APPENDIX B

Suggestions on Instruments for Field Testing

Types of instruments deemed suitable for field testing of residential or small commercial heat pump installations, and for demonstration or semi-experimental projects, are described below.

Since personnel of Sales or Engineering Departments of utility companies assigned to such testing work may at the start be unfamiliar with the instrument requirements, information on specific makes, types, calibration ranges and net prices are given, as an aid to the issuing of purchase requisitions where necessary. The following classes of instruments are covered.

A. *Pressure*
   (1) Bourdon-type gages
   (2) Two-pen recorders

B. *Temperature*
   (1) Glass thermometers
   (2) Two-pen recorders

C. *Liquid Flow*
   (1) Disc meters
   (2) Orifice meters

D. *Air-flow*

Instruments for electrical measurements such as watt meters, watthour meters and demand meters are not listed, since whatever types are in use by the utility company for customer services, for routine field testing or for laboratory work will be acceptable for heat pump applications.

A-1—Pressure Gages (indicating type)

For determining suction and discharge pressures at compressor, accurate gages that can be read to one psi are necessary. Relation between refrigerant pressure and saturated-vapor temperature taken from a temperature-pressure chart is as shown below for two conditions.

	Pressure, Psig	
Temperature Level	*Freon-12*	*Freon-22*
For evaporator, in vicinity of 20 F	21.1	43.3
For condenser, in vicinity of 120 F	157.1	262.6

Since temperature range through which the refrigeration cycle operates is ascertained by measurement of pressure,

APPENDIX A

Date_____
Reporter_____

INSTALLATION DATA

1. LOCATION OF HEAT PUMP SYSTEM (City)_____
2. UTILITY COMPANY_____
3. COMPRESSOR DATA: Manufacturer_____ Type_____ Model_____ Serial Number_____
4. UNIT MANUFACTURER (If package unit)_____
5. INSTALLER (Contractor)_____
6. DATE OF INITIAL OPERATION_____
7. RATED CAPACITY, Btu/hr: Heating_____ Cooling_____
8. MOTOR RATING Hp: Compressor_____ Fans_____ Pumps_____ Other_____ Total_____
9. ELECTRICAL CHARACTERISTICS: Voltage_____ AC or DC____ Phase_____
10. HEAT SOURCE_____
11. NUMBER OF UNITS IN SYSTEM_____
12. SPACE SERVED: Type Structure_____ Volume, Net cu.ft._____
13. DESIGN CONDITIONS:
    Heating Cycle, Outdoor_____ F db; Indoor_____ F db
    Cooling Cycle, Outdoor_____ F db; _____ F wb
    Indoor_____ F db; _____ % rh
14. CALCULATED LOAD, Btu/hr: Heat Loss_____ Heat Gain_____

* For description of recommended test procedure see "Suggested Field Test Procedure for Determination of Coefficient of Performance and Performance Factor of an Electric Heat Pump" recommended by Joint AEIC-EEI Heat Pump Committee.

1.

Fig. 1

FIELD TEST DATA

FOR COMPRESSOR PRESSURE METHOD* Date_____

	Heating	Cooling
15. COMPRESSOR:		
Head Pressure, psig		
Suction Pressure, psig		
Condensing Temperature, F		
Suction Temperature, F		
16. REFRIGERANT LIQUID SUBCOOLING COIL:		
Liquid Temperature, F, entering		
Liquid Temperature, F, leaving		
Gas Temperature, F, entering		
Gas Temperature, F, leaving		
17. ELECTRIC POWER REQUIREMENT, KW:		
Compressor (s)		
Fan (s) (describe)		
Pump (s)		
Other		
Total		
18. CAPACITY OBTAINED, Btu/hr: (output)		
Latent		
Sensible		
Total		
19. COEFFICIENT OF PERFORMANCE:		
Heat Pump		
Heat Pump System		

ADDITIONAL DATA FOR ALTERNATE TEST METHODS (Appendix D*)

20. CONDITIONER COIL:		
Air Quantity, cfm		
Entering Temperature, F	db	db
	wb	wb
Leaving Temperature, F	db	db
	wb	wb

(Continued on page 3.)

2.

Fig. 2

the selection of gage type and periodic check of calibration are important.

Gages for field tests should be of rugged type with well seasoned Bourdon tubes, machine-cut gears, bronze-bushed reamed bearings, plain or flanged black iron case having black or plated rim of plain or screwed-on type. Connection should have ¼-in. standard pipe thread. Arc for Bourdon tube travel should be approximately 270 deg; recalibration device should be provided to allow readjustment of zero and to give pointer-movement proportionality throughout full scale range. Nominal dial size should be not less than 4½ in. Guaranteed accuracy should be within 0.5 per cent of reading.

For Freon-12, pressure range should be 0 to 200 psig and for Freon-22, 0 to 300 psig; gages for suction should have same range as for discharge. Graduation of dial should be in 5-psi divisions.

Information for ordering from Jas. P. Marsh Corp., Chicago, Ill., which supplies gages adopted as standard by a number of refrigeration and air-conditioning equipment manufacturers, is as below. The three alternate models listed

Above and at right —Pages 1, 2 and 3 of the "Questionnaire for Installation and Field Test Data on Heat Pump Systems" for analysis by the Joint AEIC-EEI Heat Pump Committee.

	Heating	Cooling
21. VENTILATION AIR:		
Quantity, cfm		
Entering Temperature, F	db	db
	wb	wb
22. CONDENSER-COOLER:		
Water or air quantity, gpm or cfm		
Temperature, F, entering	db	db
	wb	wb
leaving	db	db
	wb	wb

23. COMMENTS:
    a. Operating features_____
    b. Difficulties experienced_____
    c. Suggested improvements_____
    d. Other_____

REMARKS, DIAGRAMS OR ADDITIONAL INFORMATION

Return to:
E R Ambrose, Chairman
Joint AEIC-EEI Heat Pump Committee
c/o Edison Electric Institute
420 Lexington Avenue
New York 17, N Y

3.

Fig. 3

are equally acceptable; choice will be governed by availability for prompt shipment.

Type No. 100 Mastergauge constructed with lathe-bored and turned stainless-steel Bourdon tube, screwed to tip and socket; equipped with recalibrator device; range to 200 psig (or 300 psig), dial size 4½ in.; plain iron case and plain black iron rim fastened with holding screws; ¼ in. ips male thread connection; price $38.76.

Type No. 101 Mastergauge constructed with drawn stainless steel Bourdon tube; range and other details same as above; price $27.60.

Type No. 103 Mastergauge constructed with drawn bronze Bourdon tube and brass tip and socket; range and other details as above; price $27.60.

Gages produced by other manufacturers, of comparable grade and same dial size and graduations, are equally acceptable.

A-2—Pressure Recorders (2-pen type)

Where continuous record of two pressures is desired, such as for refrigerant pressure at inlet and outlet of compressor, a conventional recording instrument with circular chart 12-in. diameter (or 10 in.) is suitable. Description for ordering from Brown Instruments Company, New York, N. Y., is as follows:

Non-Control Recording Pressure Gage, Two-Record—702 x 2 series, described in Catalog 6708, page 15.

Chart—12 in. diam, calibrated width 4⅝ in., 24-hr or 7-day revolution.

Chart drive—synchronous motor for 115 or 230 volts.

Case—rectangular, universal type for surface or flush mounting.

Accuracy—within 1% of total scale span.

Model No. 702 x 21C 20-X-74.

Standard charts carried in stock.

No.	Scale Range, F	Value per Division, F	Rev
12518	0-200	2	24-hr
12582	0-200	2	7-da
12521	0-300	5	24-hr
12595	0-400	5	7-da

Price, including micrometer type calibration adjustment, f.o.b. Philadelphia $118.00.

B-1—Thermometers (indicating type)

For refrigerant, water, and air temperatures, thermometers of mercury-in-glass laboratory type should be used, preferably of "Standard" or "ASTM Specification" grades. Least division should be no larger than 1 F; glass-stem types should preferably have tubes with magnifying lens and red background features.

Thermometers deemed suitable for this service, manufactured by two representative companies, i.e., Moeller Instrument Company, Inc., Richmond Hill, N. Y., and Taylor Instrument Companies, Rochester, N. Y., are described for ordering as below. Choice between the three alternative types will be governed by availability and local preference.

Standard grade solid-glass etched-stem thermometer, mercury filled, lens-front magnifying tube with red-reading column and ring top, calibrated for 3-in. immersion.

Scale Range, F	Division, F	Length, In.	Moeller Cat. No.	Moeller Price	Taylor Cat. No.	Taylor Price
0-120	1	12	3373	$2.10		
—40-120	1	12			21271	$2.00
0-220	1	12	3376	$2.10		
0-220	2	12			21275	$2.00

Same as above, but equipped with steel armor nickel-plated, calibrated for 3-in. immersion.

Scale Range, F	Division, F	Length, In.	Moeller Cat. No.	Moeller Price	Taylor Cat. No.	Taylor Price
0-120	1	12	3500-A	$3.95		
—40-120	1	12			21270	$3.80
0-220	1	12	3506	$3.95		
0-220	2	12			21274	$3.80

Solid-glass etched-stem thermometer, without red reading column, made in accordance with ASTM specifications and intended for testing petroleum products and lubricants; for low soft point of tar products, ASTM Designation E-1 (15 F-39), specially calibrated for 3-in. immersion instead of total immersion.

Scale Range, F	Division, F	Length, In.	Moeller Cat. No.	Moeller Price	Taylor Cat. No.	Taylor Price
+30 to +180	0.5	15	2330	$4.00	21715	$4.80

Standard thermometer test wells are obtainable from Moeller and Taylor as below:

Standard thermometer test well for laboratory-type etched-stem glass thermometers.

Material—brass bar stock.

Stem length including thread, in.—3½.

Inside diameter bore, in.—7/16.

Outside diameter below thread, in.—⅝.

Pipe thread size, in.—½.

Wrench head—milled on two sides or hexagonal.

Cap—screw plug attached with chain.

Moeller Cat. No.	Moeller Price	Taylor Cat. No.	Taylor Price
2752	$2.75	21987	$3.30

In brass wells, mercury should not be used as the contact medium, since it will form an alloy. At temperatures low enough to cause condensation on thermometer, anti-freeze liquid (ethylene glycol or alcohol) should be utilized in preference to oil if temperature is below 32 F to prevent water accumulation that may cause thermometer bulb to freeze into the well.

B-2—Temperature Recorders (2-pen type)

Where continuous record of only two temperatures is desired, such as for refrigerant inlet and outlet, indoor and outdoor air, indoor air dry-bulb and wet-bulb, water entering and leaving, etc., a conventional recording instrument with circular chart 12-in. diam (or 10 in.) is suitable. Mercury-actuated type is preferred to vapor type because it has uniformly graduated temperature scale and greater power available for pen actuation. Description for ordering from Brown Instruments Company is as follows:

Non-Control Recording Thermometer, Two-Record—602 x 2 Series, described in Catalog 6708, page 10.

Chart—12 in. diameter calibrated width 4⅝ in., 24-hr or 7-day revolution
Chart drive—synchronous motor for 115 or 230 volts
Case—rectangular, universal type for surface or flush mounting
Accuracy—within 1% of total scale span
Additional price for capillary tubing, per bulb, $0.85 per ft.
Standard charts carried in stock:

No.	Scale Range, F	Value per Division, F	Rev.
12691	0—125	2	24-hr
12516	0—150	2	24-hr
12581	0—150	2	7-da

Price, including 5-ft capillary tubing and plain stainless-steel bulbs, f.o.b. Philadelphia $195.

If instrument is wanted for determining relative humidity, it can be obtained with wet and dry bulb assembly No. 966A1-12E, comprising water-bottle assembly, bracket and porous-tube assembly, for use with natural or fan circulation of air, at price $28.25. With this assembly there is required flexible double capillary tubing of bronze construction, at price $1.15 per ft.

Recorder of type described as "adaptor block" permitting easy removal of actuating element (with capillary tubing and bulb attached) for replacement or substitution of another element assembly to give change of range, by the user.

C-1—Water Meter (disc type)

For measurement of water supplied to evaporator (as heat source) or to condenser (as disposal medium), positive volumetric displacement meter of disc type with register dial is suitable. Information for ordering from Neptune Meter Company, New York City, is as follows:

Neptune Trident Meter for cold and warm water service, Model 157 with horizontal totalizer register having six numeral wheels reading to 999,999 US gal, also a rotating hand making one rev per gal; all-bronze construction for 125-psig working pressure, spuds equipped with male thread for standard pipe coupling.

Meter Size	Pipe Size, In.	Flow, Gpm Maximum	Flow, Gpm Minimum	Friction, Psi	Price Net
⅝	½	20	2		$22.50
¾	¾	30	3		30.00
1	1	45	5		45.00
1½	1½	65	10	6	75.00
2	2	100	16	4	112.50

Friction as tabulated is at maximum rated flow; at 50 per cent rating, friction is 25 per cent of value tabulated. Accuracy is approximately ±2 per cent through stated capacity range and can be improved by field calibration with rotating hand provided for that purpose.

Trident meters of Split Case or Frost Proof types for domestic water-supply service may also be used, if frequently calibrated by volumetric or weight check. Information for ordering is shown below.

Meter Size	Rating Gpm	Friction Psi	Price, Net
⅝	20	8	$16.00
¾	34	12	24.00
1	53	6	35.20

Accuracy is the same as for Neptune Trident meter, ie., ±2 per cent.

C-2—Water Meters (orifice type)

Alternative to displacement meters of totalizing type, orifice meters may be utilized if preferred; suitable models are available from manufacturers including Brown, Fox, Leeds and Northrup, Republic, etc. Orifice flanges and a simple type of indicating manometer are obtainable from the Meriam Instrument Company, Cleveland, Ohio, on specification and at price indicated below:

Orifice Flanges with double meter connections spaced for standard flange taps, complete with flange bolts and gaskets; Series 30 for 250-psig service, of semi-steel; orifice plate of brass for cold and warm water, with ear stamped to show orifice size and identification number.

Pipe Size, In.	Price Flanges, per Pair	Price Orifice Plate
¾	$8.50	$8.10
1	8.50	8.10
1¼	8.50	8.33
1½	9.55	8.55
2	10.85	8.78
2½	12.25	9.00
3	13.60	9.68

Inclined Tube Flow Meter Model A-211 for working pressure 150 psig, with drop leg for fluid retention, wall-mounted case, differential pressure 50 in. water when using mercury or 4 in. water when using red oil; price $50.63.
Control valves and piping manifold for Model A-211 flow meter; price $20.40.
Red Seal Oil, colored red for flow meter, specific gravity 0.827; price per quart $1.20.
Mercury for flow meter, sold at prevailing price.

Purchase order should stipulate the desired maximum rate of flow and temperature range of water, so that diameter of orifice can be properly sized to give pressure differential 50 in. water column (1.8 psig) for use with mercury in meter, or 4 in. water column with red oil if low orifice friction loss is important. Manufacturer will supply calibration curve for orifice plate and instructions as to length of straight pipe required ahead of flanges.

D—Air Flow

Because of the practical difficulties involved, air quantity measurement in the field by this method is not recommended.

APPENDIX C

Standardized Form for Compressor Rating Data

Chart and tabular forms, convenient for use in heat pump performance calculations, are indicated on following specimen sheets. It is suggested that all compressor manufacturers participating with electric utility companies in the development and promotion of heat pump equipment, arrange to utilize these forms or modification thereof as may be agreed upon. Standardization along such lines has already been started through a committee of Air Conditioning and Refrigerating Machinery Association, cooperating with the Joint AEIC-EEI Heat Pump Committee.

Value of least division on chart and of interval for entries in tabulation should be selected to permit precise determination of capacity and power input, to at least the third digit. The latter is important as a check on physical conditions of compressor or on accuracy of field test data. (See Figs. 4 & 5).

PERFORMANCE RATINGS ("FREON-12" REFRIGERANT)

ASRE RATINGS AND TESTING METHOD

Sat Refr Temp (Deg F)	Condensing Temperature (Deg F)										
	77	84	90	96	102	107	112	117	122	126	130
	Head Pressure (Psi Gage)										
	80	90	100	110	120	130	140	150	160	170	180
	CAPACITY (Btu per hr)										

COMPRESSOR SPEED—920 RPM

48	88,100	84,900	82,300	79,800							
44	81,500	78,600	76,000	73,600							
40	75,300	72,700	70,300	68,100							
36	69,800	67,300	64,900	62,800							
32	64,300	62,000	60,100	58,100							
28	59,400	57,300	55,300	53,600	52,000						
24	54,700	52,600	50,900	49,200	47,700						
20	50,200	48,400	46,700	45,100	43,600	42,300					
15	44,800	43,200	41,800	40,300	39,200	37,900	36,800				
10	40,300	38,900	37,500	36,300	35,100	33,900	33,000	32,100	31,100		
5	36,100	34,700	33,400	32,300	31,300	30,200	29,400	28,700	27,900	27,100	26,300
0	32,200	31,000	29,900	28,900	27,900	27,700	26,300	25,500	24,700	23,900	23,400
- 5	28,500	27,500	26,500	25,800	25,000	24,100	23,400	22,600	21,800	21,300	20,600
-10	25,200	24,300	23,400	22,600	21,900	21,200	20,500	19,800	19,200	18,700	18,100
-15	22,200	21,400	20,600	20,000	19,200	18,700	18,000	17,300	16,800	16,300	15,800
-20	19,600	18,900	18,100	17,600	17,000	16,300	15,800	15,200	14,700	14,300	13,800
-30	14,900	14,200	13,700	13,100	12,600	12,100	11,700	11,300	10,800	10,500	10,100

Capacities based on 65F suction gas entering compressor, and no sub-cooling.

POWER INPUT, KW (For Types CM-63T and J)

COMPRESSOR SPEED—730 RPM

Ref. Temp. (Deg.F)	Head Pressure (Psi gage)									
	80	90	100	110	120	130	140	150	160	170
48	3.03	3.28	3.50	3.70	3.94	4.15	4.37	4.59	4.77	4.98
44	3.14	3.35	3.54	3.75	3.94	4.14	4.33	4.53	4.70	4.89
40	3.20	3.37	3.55	3.75	3.91	4.10	4.28	4.45	4.60	4.78
36	3.23	3.40	3.55	3.71	3.89	4.06	4.20	4.38	4.52	4.69
32	3.24	3.38	3.54	3.69	3.85	4.00	4.15	4.29	4.42	4.57
28	3.23	3.36	3.50	3.65	3.81	3.93	4.09	4.20	4.32	4.45
24	3.20	3.34	3.46	3.59	3.74	3.85	3.99	4.10	4.20	4.32
20	3.17	3.28	3.40	3.53	3.65	3.77	3.89	3.98	4.09	4.20
15	3.10	3.20	3.30	3.42	3.55	3.65	3.75	3.83	3.91	4.02
10	3.01	3.11	3.22	3.30	3.42	3.51	3.60	3.68	3.75	3.83
5	3.12	3.02	3.10	3.20	3.30	3.37	3.47	3.52	3.58	3.65
0	3.03	3.11	3.00	3.09	3.17	3.23	3.30	3.36	3.41	3.46
- 5	2.92	3.00	3.07	3.15	3.03	3.10	3.15	3.20	3.25	3.28
-10	2.82	2.90	2.95	3.02	3.08	3.13	3.17	3.02	3.06	3.10
-15	2.73	2.77	2.83	2.87	2.93	2.96	3.02	3.05	3.09	3.08
-20	2.64	2.67	2.72	2.75	2.80	2.82	2.85	2.87	2.87	2.87
-30	2.45	2.45	2.47	2.49	2.50	2.50	2.50	2.50	2.50	2.47

COMPRESSOR SPEED—820 RPM

Ref. Temp. (Deg.F)	Head Pressure (Psi gage)									
	80	90	100	110	120	130	140	150	160	170
48	3.51	3.80	4.05	4.30	4.57	4.82				
44	3.65	3.87	4.10	4.34	4.57	4.79	5.00			
40	3.70	3.92	4.13	4.34	4.53	4.75	4.97			
36	3.74	3.93	4.13	4.30	4.50	4.70	4.89			
32	3.75	3.93	4.10	4.28	4.45	4.63	4.81	4.99		
28	3.74	3.90	4.06	4.23	4.38	4.57	4.72	4.86	5.00	
24	3.72	3.86	4.00	4.15	4.31	4.47	4.60	4.75	4.84	5.00
20	3.67	3.80	3.95	4.08	4.23	4.37	4.50	4.63	4.74	4.86
15	3.59	3.70	3.83	3.98	4.09	4.23	4.35	4.45	4.54	4.65
10	3.50	3.60	3.72	3.83	3.95	4.05	4.17	4.27	4.35	4.45
5	3.40	3.50	3.60	3.70	3.82	3.90	4.00	4.08	4.15	4.25
0	3.30	3.40	3.48	3.58	3.67	3.73	3.82	3.90	3.96	4.02
- 5	3.20	3.28	3.35	3.43	3.50	3.59	3.65	3.70	3.75	3.80
-10	3.10	3.17	3.23	3.30	3.37	3.42	3.48	3.50	3.55	3.60
-15	3.00	3.05	3.10	3.15	3.21	3.25	3.30	3.33	3.37	3.33
-20	2.88	2.93	2.98	3.00	3.05	3.10	3.17	3.15	3.15	3.15
-30	2.68	2.68	2.72	2.72	2.73	2.75	2.75	2.75	2.73	2.72

COMPRESSOR SPEED—920 RPM

Ref. Temp. (Deg.F)	Head Pressure (Psi gage)									
	80	90	100	110	120	130	140	150	160	170
48	3.98	4.30	4.60	4.88						
44	4.10	4.38	4.64	4.93						
40	4.17	4.42	4.65	4.93						
36	4.23	4.44	4.65	4.89						
32	4.25	4.43	4.64	4.85						
28	4.24	4.41	4.60	4.80	5.00					
24	4.19	4.36	4.55	4.70	4.90					
20	4.14	4.30	4.46	4.63	4.80	4.96				
15	4.05	4.19	4.35	4.50	4.65	4.80	4.93			
10	3.95	4.06	4.21	4.34	4.50	4.60	4.73	4.85	4.94	
5	3.85	3.95	4.05	4.20	4.32	4.42	4.54	4.62	4.70	4.80
0	3.73	3.82	3.93	4.03	4.15	4.24	4.34	4.41	4.48	4.53
- 5	3.60	3.70	3.80	3.87	3.98	4.05	4.11	4.20	4.26	4.30
-10	3.47	3.57	3.65	3.72	3.80	3.85	3.92	3.96	4.01	4.05
-15	3.37	3.44	3.50	3.55	3.62	3.67	3.73	3.75	3.80	3.80
-20	3.27	3.32	3.36	3.40	3.45	3.49	3.52	3.55	3.55	3.55
-30	3.03	3.05	3.07	3.08	3.10	3.11	3.12	3.12	3.10	3.08

CONDENSER WATER TEMPERATURE RISE FACTORS*

Ref. Temp. (Deg.F)	Inlet Water Temp. (Deg. F)					
	60	70	75	80	85	90
48	.137	.140	.141	.142	.143	.144
40	.139	.142	.143	.144	.145	.146
32	.141	.144	.145	.147	.148	.149
24	.143	.146	.148	.149	.150	.152
15	.146	.149	.150	.152	.153	.154
0	.150	.153	.155	.156	.157	.158
-15	.153	.157	.159	.161	.162	.163
-30	.157	.162	.164	.166	.167	.167

*Degrees (F) rise = Factor x $\frac{\text{Btu/hr}}{\text{gal/hr}}$

CONDENSER WATER DATA (For Type CM-63T)

CONDENSER WATER PRESSURE DROP* (Psi)

Unit	Flow	Water Flow — Gallons per hour in 1000's										
		.2	.3	.4	.5	.6	.8	1.0	1.2	1.5	2.0	3.0
CM-63T	Series	4	9	15	24	33	57	86	120			
CM-63T	Parallel			1	2	3	4	6	9	14	24	50

* Based on clean condenser tubes. Scale formation in the tubes will increase these values 30% or more.

Fig. 4—Tables of Performance Ratings and Operating Data for GE Compressor Unit, Type CM-63J (Without Condenser), 3 and 5-Hp Motors

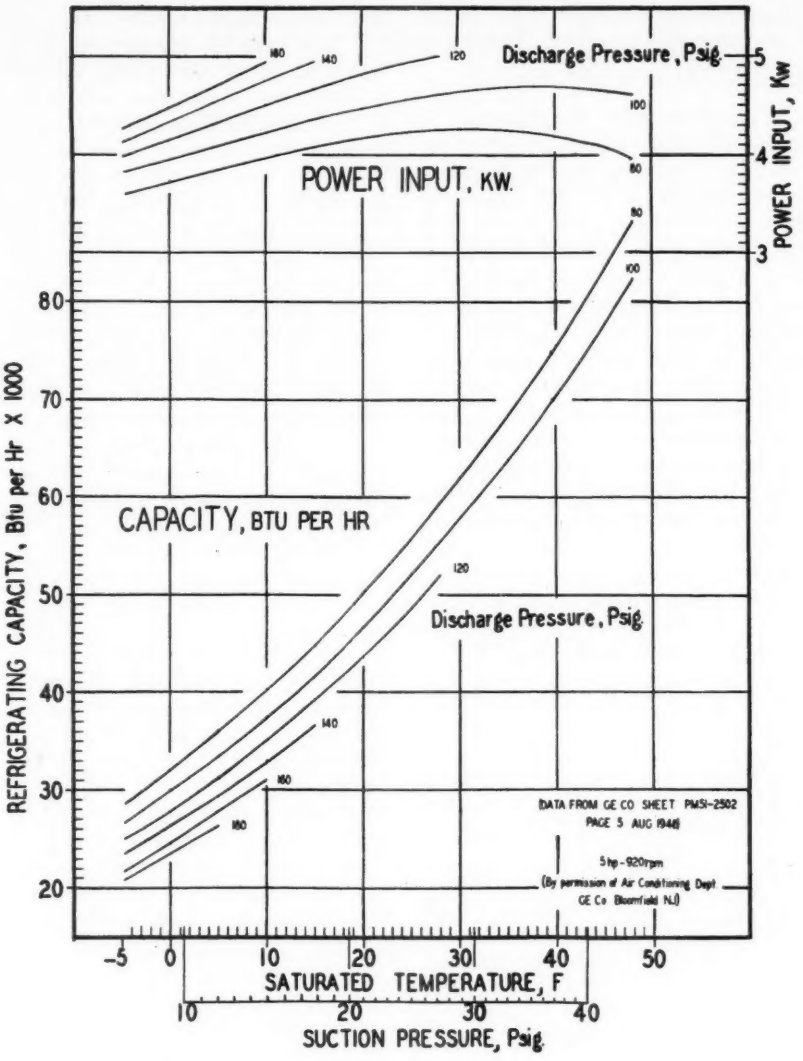

Discharge Pressure, Psig.
POWER INPUT, KW.
POWER INPUT, Kw
CAPACITY, BTU PER HR
Discharge Pressure, Psig.
REFRIGERATING CAPACITY, Btu per Hr X 1000
DATA FROM GE CO SHEET PMSI-2502
PAGE 5 AUG 1948
5hp-920rpm
(By permission of Air Conditioning Dept GE Co Bloomfield N.J.)
SATURATED TEMPERATURE, F
SUCTION PRESSURE, Psig.

Fig. 5—Compressor Performance Ratings, Specimen Chart of Manufacturer's Data

APPENDIX D

Alternate Testing Methods

A—Air Flow-Temperature Method

The performance of systems using air as the heating medium may be determined by measuring the air quantity delivered to the space and the temperature difference between the entering and leaving air. Unfortunately, air quantity passing over a finned coil can seldom be measured in the field with acceptable accuracy, owing to non-uniform and fluctuating velocity over the face of the coil, and through the cross-section of inlet or outlet ducts. Non-uniform temperature at different portions of the coil-face area and within ducts further impairs accuracy of results. Measurements of exit velocity at discharge grilles or diffusers in rooms, and determination of net effective grille areas, are likewise difficult. Consequently, the air flow-temperature methods are not considered acceptable for field tests.

A method of obtaining rough field check of performance from the air flow-temperature method is possible, if the heat pump arrangement is such as to permit manufacturer to determine by laboratory test the relation between pressure drop across the finned coil and rate of air flow. Permanent connections for draft gage and a chart or tabulation giving calibrated pressure-flow values would then be furnished for each model, with indication of any necessary correction factors such as the duct arrangement at point of attachment to the unit.

B—Liquid Flow-Temperature Method

The coefficient of performance and the performance factor of a system using water as the heating medium, and water or any other liquid as the heat source, can be determined by measuring the quantity of liquid circulated and the entering and leaving temperatures. If water is used as the heating medium, this method is very satisfactory. However, very few heat pump installations employ this indirect system. Measurements of heat quantities from a source should only be used as a secondary check method, since the heat supplied by the motors must be added, which is somewhat of an indeterminate.

C—Measurement of Heat Delivery by Refrigerant

Inherent difficulties in measurement of refrigerant flow-rate and temperature in either liquid or vapor phase, made this method impracticable for field testing of heat pumps. With both condensation and evaporation occurring within the cycle, the circuit temperatures are close to boiling points at the respective pressures; vapor bubbles may form or be entrained in liquid, and slugs of liquid are likely to occur in the vapor lines. Action of thermostatic expansion valve gives unsteady flow conditions and causes rapid fluctuation of super-heat in vapor and of subcooling in liquid. Presence of lubricating oil, miscible with the refrigerant, adds to the difficulties. Even under laboratory conditions, the results from metering and temperature measurement of refrigerant are generally undependable and inconsistent.

D—Fuel-Comparison Approximation

This method of indicating performance is of little value, except for some publicity uses; if employed the resulting factor should be designated as approximate and the basis explained by suitable footnote or another reference.

The procedure can be applied where heat pumps are installed in residences

that constitute units of a housing development identical as to size, construction, exposure, occupancy, etc., and other dwellings in group that have conventional heating systems using gas or oil fuel. Performance factor can be obtained from records of electric and fuel consumption. Readings of indoor temperature (day and night) and notations on any unusual occurrences with respect to occupancy or use of lighting system and appliances are necessary for each of the houses involved in such comparison. Heat value of fuel must be ascertained and efficiency of utilization determined whenever possible by test, and in other cases from manufacturers' rating data, with adjustment according to judgment for departure from normal excess-air ratio as shown by flue-gas analysis, draft-gage reading or inspection of burner and flame conditions.

E—Other Methods Not Approved

A variation from the procedure in section D occurs where heat pump has replaced a fuel-fired heating system on which there are records of fuel consumptions for prior years. Use of such data for estimating the performance factor is generally inadvisable, because of uncertainties as to structural changes (insulation, weather stripping, storm sash, etc.) coincidental with heat-pump installation. Moreover, weather conditions, average indoor temperature and character of occupancy are subject to variations for which it is impracticable to make proper adjustment in the estimate.

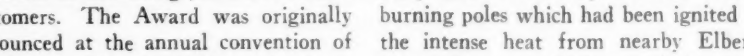
Another method which has sometimes been used is based on use of calculated heat loss from building for the design conditions, as a measure of heat delivered by heat pump. Assumption is made that daily and seasonal heat quantities can be established by degree-day proration. For example, if design conditions are 10 F and 70 F, and heating load computed by ASHVE Guide procedure is 60,000 Btu per hour, the heat per degree-day becomes $60{,}000 \times 24/(65—10) = 26{,}200$ Btu; for locality having 5000 degree-day climate, seasonal heat would be derived as $26{,}200 \times 5000 = 131{,}000{,}000$ Btu. This method disregards such factors as sunshine, actual wind velocity, heat gain of domestic appliances, occupancy variations and the like. Consequently the method should not be used.

Matthews Valor Award Medals Presented

FORMAL presentation of the Claude L. Matthews Valor Award Medals to the members of a Georgia Power and Light Co. line crew was made on Sept. 20, in Bainbridge, Ga., as recognition of their heroic work during a raging fire in preventing a long electrical service interruption for five Georgia towns, a suburb of Bainbridge, and 1000 rural customers. The Award was originally announced at the annual convention of the Edison Electric Institute in June, with the presentation of a scroll to line-crew foreman J. A. Pollock.

Claude L. Matthews, donor of the award, honored Mr. Pollock's crew by cutting short a South American air tour to personally present the medals to the men at a testimonial dinner attended by civic leaders and company officials. Crew members winning the award were: Tom King, E. L. Ivester, Dewitt King, R. L. Nix, Joe J. Nichols, I. W. Parker, R. S. Brinson, Tom H. Dodson, A. F. Jordan and H. O. Thomas.

This Bainbridge line crew courageously and voluntarily climbed several burning poles which had been ignited by the intense heat from nearby Elberta Crate Factory which was being consumed by fire. Pulling the fire hose up the poles with them, they extinguished the pole and crossarm fires and saved the poles and lines, thereby maintaining electric service to the five communities and hundreds of rural customers.



Pictured above are opposite sides of the Claude L. Matthews Valor Award medal which was presented to individual members of a Georgia Power & Light Company line crew in Bainbridge, Ga.

Given the highest commendation by the Edison Electric Institute Awards Committee, this line crew's service was also greatly appreciated by the communities where long electrical service interruption was prevented. Each of the towns was generous in its praise of the work done by Pollock's crew, and the town council of each community offered an official resolution signalizing "this courageous action which was far beyond the reasonable demands of duty."

Archer K. Jones

ARCHER K. JONES, who retired from the Florida Power & Light Company June 1 after 10 years as administrative assistant with the company, died Sept. 6 of a heart attack.

Mr. Jones was a life member of the American Institute of Electrical Engineers and during the last war he served as Secretary of State Selective Service Appeal Board No. 4.

Thirty years of his life were spent in Central and South America. He was vice president and general manager of the Cuban Electric Company (Cia. Cubana de Electricidad), Havana, Cuba, and general manager of the Chilean Electric Company (Cia. Chilena de Electricidad), Santiago, Chile.

During his ten years as administrative assistant with the Florida Power & Light Company, he served as Chairman of the Employee's Suggestion Committee. He was 65 years of age at the time of his death.

Electric Power Demand Continues High Growth Rate

Survey Shows Large Increase in Installation of New Generating Equipment

A CONTINUATION of the high rate of growth of electric power demand in most parts of the United States and a large increase in the rate of installation of new generating capacity were reported by Ernest R. Acker, President of the Edison Electric Institute, in commenting on the results of a survey completed last month by a group of the electric industry's top-flight power supply experts representing all sections of the country.

The survey finds that installation of new generating capacity, which in 1947 was 2,000,000 kw, will be 4,750,000 kw in 1948 and 6,700,000 kilowatts in 1949.

The 1950 installation schedule is 5,800,000 kw and for 1951 is 6,060,000 kw.

Deliveries of generating equipment are generally being made a little ahead of schedule, although there is some difficulty in getting construction steel, piping, and other construction accessories for equipment installation.

The survey also finds that currently, with equipment manufacturers working at full capacity and with their output far exceeding all previous records, the demand for electricity has continued to climb. The new estimate of peak demand for December, 1948, is 1 per cent higher than the forecast made by the same group of experts last May. The somewhat higher demand is attributed principally to the influence of world conditions on U. S. business and industrial production.

Reserve generating capacity for the country as a whole during the coming December is expected to be 4 per cent as compared with a 5 per cent margin in December of last year. Reserves will be somewhat less than last winter in a few areas, and somewhat greater in others, but generally sufficient to meet the needs for power, said President Acker.

On the evidence of the present survey the power experts estimate that the December, 1949 average margin will climb to 8 per cent and that 14 per cent, which is regarded as a normal reserve, will be reached by 1951. However, the validity of these estimates for the future will depend, as in the case of the 1948 estimate, on the influence of world conditions on this country's industrial index.

At the end of 1946 the total generating capacity of the electric industry in the U. S. was 50,316,621 kw. Additions already made and scheduled for the five-year period 1947-1951 inclusive amount to 25,300,000 kw—a 50 per cent increase over 1946 in capacity; an expansion far exceeding that for any other major industry in the same period.

Of the total amount of new installations, 20,900,000 kw will be added by the business-managed, privately owned companies, and 4,400,000 kw by governmental power agencies and municipal plants. Steam power plant installations will account for 83 per cent of the total additions.

Important factors contributing to the unprecedented increase in demand for electric service are the addition of 6,000,000 new customers since V-J Day —an increase of 18 per cent over the total accumulated in the previous 63 years of the industry's growth. The backlog of postwar customers awaiting service, however, has been substantially eliminated and the rate of increase in total customers is beginning to slacken.

ERP needs, increased attention to defense requirements and their collateral effect of stimulating civilian production, have brought gains in the use of electricity in industry. Using 1939 as 100, index figures show that for the month of August, 1948, industrial consumption of electricity stood at 213 and manhours of manufacturing at 170. This compares with the December, 1947, index figures of 196 for industrial electricity consumption and the same figure of 170 for manhours in manufacturing. The high cost of labor and the relatively cheap cost of electricity is another big factor in greater electrification.

"The electrical industry since the close of the war has done a remarkable job in the face of extraordinary load growth in catching up on the installation of new generating capacity which was so seriously interrupted during the war," Mr. Acker stated.

He noted, however, that with the conditions imposed by lower than normal reserve generating capacity it may happen, as it did in a few instances last year, that a combination of bad weather and equipment outage coinciding with hours of peak demand may necessitate some load shifting by industrial establishments to off-peak hours, some appeals to commercial and residential customers for conservation of electricity, and even some curtailment during the period of such emergencies. The shortage of water for hydroelectric generation, due to severe drought, is an adverse factor at present in the north central and northeastern part of the United States.

Summing up the present situation, Mr. Acker said, "We had expected to be a little better off on power reserves this year over last year, but this December will find us in about the same situation we were last year. Through interconnection and careful coordination of reserve capacity within systems and between adjoining power systems the amount of curtailment was not significant last year. We expect to do as well this December."

"The Application and Care of Rubber Protective Equipment" Recently Published by EEI

A NEW 31-page booklet prepared by the Institute's Accident Prevention Committee is now available for distribution. It is a companion piece to the booklet "Use and Care of Pole Climbing and Equipment" and is one of a series of manuals being prepared for the industry by the committee.

The booklet is illustrated with over 50 photographs which clearly demonstrate the subject matter and at the same time enable the reader to visually compare his established procedures with those suggested by the committee.

The purpose of this manual is to portray in a comprehensive and concise manner the proper use of rubber protective equipment for work on electric lines. The efforts of every member of the Accident Prevention Committee of the Edison Electric Institute were given to its preparation. Pictorial matter predominates because of its direct and effec-

(*Continued on page 350*)

Summary of Survey of Degree of Standardization of Electric Water Heating Practices as of January 1, 1948

A Report of the EEI Electric Water Heating Committees
Tom D. Fulford, Chairman

THE EEI Electric Water Heating Committee has recently completed a survey of the degree of standardization of electric water heating equipment and practices within the electric utility industry, as of Jan. 1, 1948.

7 Per Cent Saturation

Of the 180 questionnaires distributed, 103 were filled out and returned, illustrating the great interest in this subject. A total of 17,553,837 residential and farm customers were being served by the reporting companies, with an overall water heater saturation of 7 per cent. Practically all of the companies reporting had gas competition. Eighty-six companies reported active promotion of water heating, and most of the remainder stated they would promote when the capacity situation eased.

In regard to standardization, marked progress has been made in the use of NEMA standard wattages, voltages, and thermostat settings. Eighty-five companies report they are using standard wattages, 92 are using standard voltages and 82 use standard thermostat settings and differentials. For the most part, the companies not following the NEMA standards in these particulars showed only minor differences.

The great majority of the respondents (94) also stated that heaters now being furnished by manufacturers were acceptable as to miscellaneous provisions, such as openings, tank sizes, shapes, pipe connection, heat trap, etc.

The important area of difference is in the matter of control. Of the 103 companies reporting, 42 stated they offered uncontrolled service, 60 offered controlled service, and one company offered both types. As for the number of hours in the controlled period, the replies varied from four hours to 18 hours, with 17 different variations and no more than nine companies using one period. It is of interest to note that of the reporting companies, 39 had control periods of 10 hours or less, with 16 using control periods of more than 10 hours.

As a result of this wide variation in control practices and other local considerations, the degree of conformity to NEMA standard ratios of wattage to tank capacity is not as high as some other respects. Sixty-two companies reported using NEMA standard ratios, while 33 did not, and eight gave no answer. There were a number of comments suggesting the advisability of wattage increases for better recuperation.

The other important area of difference is in wiring of heaters. Thirty-four companies specify two-wire circuit to each unit, 45 say both units are supplied by common two-wire circuit, 20 state both units supplied by three-wire circuit, four use the first two mentioned, one uses the last two and one uses all three. Eleven companies did not answer.

Tailor-made to Local Conditions

Summarizing, water heating is still, to a large extent, tailor-made to local conditions as far as methods of control and charging hours are concerned. In spite of wide variations in fundamental operating characteristics, considerable progress has been made in adoption of NEMA standard wattages, voltages, thermostat settings, and miscellaneous design characteristics. Progress toward standardization of ratios of wattage to tank capacity, as well as wiring of heaters is much slower. Until more uniformity can be obtained in basic operating characteristics, or wider tolerances established, it appears that little can be done to improve standardization in these respects.

A great many interesting and constructive suggestions were made concerning changes in design, further steps that might be taken in the standardization program, and promotion of electric water heating in general. From these comments, and from the survey results themselves, the Water Heating Committee believes the following conclusions can be drawn:

1. There should be further study by a joint NEMA-EEI Committee of higher wattage ratios, to ascertain if higher ratios will bring more companies within the standardization program.
2. All companies should review their water heating policies to ascertain if standard heaters, perhaps on slightly revised bases, can be used.
3. Wattage standards should be still further simplified.
4. All manufacturers should standardize on double throw upper thermostats on all heaters.
5. There is great need for heaters larger than 80-86 gallon capacity.
6. Magnesium rod protection should be thoroughly studied.
7. There should be a study of installation problems, including wiring of heaters, looking to lower costs.
8. Protective devices and/or method of application should be studied and standardized.
9. Dealer and customer educational material is needed.
10. The industry should review the economics of water heating, particularly as to (a) charging hours, (b) method of control, (c) rates.

"Application and Care of Rubber Protective Equipment" Recently Published by EEI

(*Continued from page 349*)

tive means of presenting the subject. The illustrations were composed and photographed in the field under the personal direction of Committee Members.

Five sections of the manual deal comprehensively with equipment, planning a job, methods of application, equipment handling and equipment maintenance. These manuals can be obtained from the Institute at 25c. each with discount of 15 per cent for quantities of 100 to 499 and 25 per cent off on quantities of 500 or more. It is the hope of the Accident Prevention Committee that this manual will be in the hands of every line department worker in the industry.

Accident Prevention Committee Meeting

E. J. Kreh, *Chairman*

THE thirty-ninth meeting of the Accident Prevention Committee was held on September 9 and 10 at the Antlers Hotel in Colorado Springs with 60 members and guests in attendance.

Survey Indicates Uptrend Reversed

W. F. Brown presented further details of the accident experience of the industry for 1947 when the frequency rate of 15.41 established a 17-year high and the severity rate of 2.39 marked a 9-year high. Most discouraging was the 56 per cent increase in the severity rate. A sample survey of accident experience for the first half of 1948 obtained from 24 companies represented on the Accident Prevention Committee and comprising over 40 per cent of the total manhours reported annually for the entire industry offers some encouragement that the upward trend has been reversed. A summary of this experience compared with that of the same companies for the corresponding period in 1947 follows:

	First Half 1948	*First Half 1947*
Manhours	116,207,355	110,065,488
Fatalities	16	20
Frequency Rate ...	11.8	12.5
Severity Rate	1.03	1.28

A detailed analysis of 173 of the 175 fatalities which occurred in 1947 was presented by D. C. Stewart. Despite the great increase in the number of fatalities the distribution among types of accidents remained substantially the same as it has been each year since 1941 when the first detailed analysis was made. About 7 out of 10 again lost their lives due to electric shock or burn. However, there was a significant increase in the percentage of fatalities due to hand contacts with energized lines and equipment. Thirty-two cases of hand contacts while performing line work on poles were reported. These are particularly distressing since almost all of them could have been prevented by the simple precaution of wearing rubber gloves when within reach of the primary area on the pole.

The tremendous increase in new construction has brought additional problems in accident prevention. E. E. Beck stressed the psychological value of training new men as a part of the regular safety training program rather than establishing a program devoted specifically to the new men. D. T. Lacey described a program for cooperating with contractors which was effective in reducing their accident rates.

Round-table discussion conducted by J. G. Dickinson included a variety of subjects. R. P. Douglas described a serious accident resulting from the careless use of trestle ladders and platforms. W. F. Brown noted numerous requests to use lefthanded rubber gloves on the right hand due to the faster wear of the righthanded gloves. Laboratory tests indicate that this practice should not be permitted even with straight-fingered gloves. Caution was recommended in the designation of accident repeaters. The laws of probability will produce a certain number who are not truly accident prone and what often is termed accident proneness is frequently merely a lack of training. Since no single test for all possible dangerous manhole conditions is available, W. R. Smith stressed the value of records showing what to expect in certain areas. Ventilation is a useful general precaution but R. P. Douglas pointed out that it is not sufficient when petroleum gases are present. T. D. Hughston reported a significant reduction in climber cutouts where a climber of radically different design has been used. T. W. Lowry and J. G. Dickinson urged caution in the use of powder-cartridge-driven steel studs. One type on the market has caused several accidents.

New Field Manual Published

The accident prevention field manual "The Application and Care of Rubber Protective Equipment" has been completed and is now available. P. L. G. Hasskarl reported good progress in the collection of data for use in preparation of the proposed field manual "The Use and Care of Live Line Tools." Drafting of the manual now will proceed.

The Committee endorsed a proposal presented by W. R. Smith recommending that the Edison Electric Institute authorize experimental research to be conducted by John Hopkins University to determine conclusively whether artifical respiration alone has any chance of recovering victims of ventricular fibrillation produced by electric shock and how much their chances for recovery may be improved by supplementing artificial respiration with electric counter shocks.

The eleventh in the series of Exchange Bulletins edited by G. J. Ruoff included description of unusual accidents resulting from the use of gasoline instead of alcohol to thin resin soldering flux, improper design of a material rest, failure to understand the simple mechanics of a scaffold support, failure to properly identify scaffold cable supports, an ungrounded primary metering installation, picking up a fallen wire, failure to cover adjacent conductors, placing an undue strain on a small tree, placing a ladder against an undercut pole, contractors' failure to wear rubber gloves in the primary area, failure to provide life belts in boats, failure to properly tighten safety harness and failure to check ash pit doors.

I. R. Dohr described progress in the revision of ASA specification for lineman's rubber protective equipment.

"Men Are Still Being Killed"

A feature of the second day was an address by A. S. Bennion, Vice President of the Utah Power & Light Company whose theme was "Men are Still Being Killed." His suggestions for reducing current accident rates included a continued effort to keep the need for a vigorous accident prevention program firmly in the minds of management, careful and continuous training of both new and old employees to combat both inexperience and overconfidence, more care in the use and inspection of protective equipment, regular pre-job analysis, accident clinics and regular spot checks of crew performance in the field.

W. T. Rogers reviewed activities of the subcommittee on training and D. C. Stewart presented a preliminary draft of a proposed report on the place of safety in the selection and training of employees. E. E. Beck described successful application of employee on-the-job training in his company.

W. F. Brown reviewed replies to an appeal for action in accident prevention, made by Charles E. Oakes, former president of the EEI, which offered specific suggestions for improving the accident record of the industry. These were quite varied and indicate the need for uniformity in methods of application and interpretation of industry safety principles. The Committee endorsed proposed rules and regulations for a safety achievement award to companies with a 25 per cent reduction in both frequency and severity rates in 1948.

W. R. Smith presented a copy of a

(*Continued on page 356*)

PERSONALS

PHILIP H. POWERS has been elected President of West Penn Power Company and West Penn Railways Company, to succeed the late Harry L. Mitchell. The new President has made several appointments and realignments within the Power Company organization, which became effective concurrently.

MR. POWERS

Mr. Powers has been identified with the West Penn Companies since 1922, when he was appointed District Manager of the Keystone Power Corporation at Bellefonte. In 1923 he was moved to West Penn's Pittsburgh office. In 1924 he was made General Manager of the Keystone Power Corporation at Ridgway, where he served until 1928. He was then appointed the Commercial Manager of West Penn Power Company with headquarters at Pittsburgh. In 1930, he was elected Vice President in charge of the Commercial Division, and was advanced in 1943 to Operating Vice President, which position he has since held.

Mr. Powers was born at Berryville, Virginia; was graduated from Virginia Polytechnic Institute in 1914, with a degree in Electrical Engineering. After graduation, he was employed by the Chester Valley Electric Company at Coatesville, Pennsylvania. In 1917 he left for World War I, seeing active service as a First Lieutenant with the 304th Field Signal Battalion, 79th Division. In 1919 he returned to his duties at Coatesville, but was transferred that year to the Kentucky and West Virginia Power Company in Williamson, West Virginia, as Assistant Division Manager. In the latter part of 1919, he became Assistant Division Manager at Logan, West Virginia, and from May 1920 to June 1922 was given special assignments in West Virginia and Kentucky in the development of new properties.

Mr. Powers is a member of the Executive Committee of the Board of Directors of the Edison Electric Institute and is also a past president of the Pennsylvania Electric Association. In Pittsburgh he has given leadership to movements for civic betterment and character development, especially in the work of the Boy Scouts of America.

West Penn's new president announces that no changes are planned in the power department, which is under ALLEN N. CARTWRIGHT, vice president.

The rate department, R. E. CAYWOOD, manager, will become a part of the financial department under W. H. SWINNEY, vice president.

Three departments are added to the responsibility of H. K. BRECKENRIDGE, vice president: Purchasing, under D. E. WINSLOW, purchasing agent; Safety, under H. F. WEBB, general safety director; and Claim, under A. R. BLUME, general claim agent.

In the operating department, J. O. CHAMBERS becomes operating manager. Reporting to him will be the division managers—L. F. Blassingham, Eastern; J. E. Fife, Northern; C. C. Gallagher, Southern; R. W. Hurd, Western; R. G. MacDonald, Keystone; and J. V. Soisson, Central. Four additional departments will be under Mr. Chambers' direction; Lines, under C. F. Sheakley, manager of lines; Real Estate, under Ralph H. Miller, manager of real estate; Commercial, under W. E. Sturm, commercial manager; and Service, under A. B. Zurick, service manager.

HARRY RESTOFSKI is named general sales manager. In addition to his present responsibilities, three new groups come under his direction: the industrial sales department under George E. Duerr, industrial sales manager; the municipal sales department under C. V. Doherty, municipal sales manager; and the advertising department under H. S. Metcalfe, advertising manager.

Mr. Powers' staff will include the vice presidents; the operating and general sales managers; Francis McQuillin as assistant to the president; C. L. McCormick as legal adviser; G. Ernest Murrie, the company secretary; H. S. Metcalfe as director of public relations; and A. J. Lois as office assistant.

It is the determination of the company, Mr. Powers indicated, to render the best possible service to its customers, to accept its full share of responsibility both to the stockholders and to the communities in the area where it furnishes electric service, and to build for the future upon the foundations so well laid by its late President, Harry L. Mitchell.

Announcement was made also of the election of HARVEY K. BRECKENRIDGE to the Board of Directors of West Penn Power Co. He had previously been elected a Director of West Penn Railways Co.

Mr. Breckenridge started with the old "American" Company in 1925, working on the organization and development of bus operations. Later he transferred to West Penn Railways in a similar activity. For many years he was assistant to the president and director of personnel, for both Power and Railways. In May of last year he was elected a vice president of the Power Company, and to the same post in Railways last winter.

R. M. EVANS, superintendent of real estate for West Penn Power Company in the Pittsburgh office, has retired from the organization in advance of regular retirement age. Mr. Evans has been with the Company for 30 years.

RALPH H. MILLER, assistant superintendent of real estate, will succeed Mr. Evans, becoming manager of real estate, and CHARLES H. ADAMS, assistant superintendent of real estate, will become assistant manager of real estate, following Mr. Evans' retirement.

Mr. Evans came with West Penn March 15, 1918, starting as assistant right-of-way agent in the Pittsburgh office. In July, 1940, he was made assistant superintendent of real estate, and the following year was promoted to his present position.

J. G. MCKINLEY, electronics engineer for the West Penn Power Co. at Pittsburgh, has been appointed system communications engineer, succeeding R. S. COOPER, who has retired after 41 years of service with the company.

Mr. McKinley has been active in all branches of the company's communication system since his employment in 1922. He has been especially active in

the engineering, installation and servicing of more than 200 units of various kinds of electronics equipment now installed over the system. In addition, he brings to the communications group considerable experience in national communications activities. Credit for the well-built coordinated system of communications maintained by the West Penn System is largely due to Mr. Cooper's efforts. He initiated many of the new ideas and modern developments in communications, among them the safety phone used by the power company's line crews.

R. M. ARMSTRONG, of Charleroi, is being promoted to the position of electronics engineer. He will continue to serve as field engineer in the installation, maintenance and testing of company-owned communication equipment.

As facilities are made available, the headquarters of the communications group will move from Connellsville to Charleroi. Mr. McKinley, however, will continue to make his headquarters at Pittsburgh. Supervision of the group for administrative purposes will be directed by H. F. Kelso, operating practices engineer, whose headquarters are at Charleroi.

W. H. DORAN, executive vice president of the Metropolitan Edison Co., Reading, Pa., was elected president of the Pennsylvania Electric Association at the annual meeting held Sept. 21 in Pittsburgh. Mr. Doran has been associated with the utility industry for 27 years and in that period of time has acquired a wealth of experience in utility operations.

CURTIS E. CALDER, chairman of the board of Electric Bond and Share Company, has announced the election of T. C. WESCOTT to the board of directors to fill the vacancy created by the death of C. E. Groesbeck. He also announced the resignation of H. H. DINKINS, JR., as secretary of the company, and the election of LESTER GINSBURG, vice-president, of B. M. BETSCH, secretary-treasurer, and of HELEN M. GILBERT, assistant secretary.

Mr. Wescott, a native of Maine and graduate of the University of Maine, has been with the Bond and Share system in various engineering and executive capacities for 37 years. During this period he has had extensive business and engineering experience in industrial and utility work both in this country and abroad. Mr. Wescott was elected president of Ebasco Services Incorporated, a wholly-owned service subsidiary of Bond and Share, in December of 1945 and has been a director of that company since August, 1941.

Mr. Ginsburg, a native of Boston, was educated at Harvard College and Harvard Business School where he specialized in public utilities and subsequently was appointed as instructor in public utility management under Professor Philip Cabot. Mr. Ginsburg has been treasurer of Electric Bond and Share Company since April, 1945. Prior to that time, he was with Columbia Gas & Electric Corporation and during the war he served as special assistant to the director general of the War Production Board.

Mr. Betsch, a graduate of New York University and native of New Jersey, came to Bond and Share in October of 1944 as assistant secretary and assistant treasurer of the company and has been a director of the company since January, 1945. A certified public accountant, Mr. Betsch formerly had been a supervising accountant with Western Electric Company and prior to that had spent a number of years as a member of the accounting staff of Haskins & Sells.

Mrs. Gilbert, formerly with Niagara Hudson Power Corporation, came to Bond and Share in August of 1944. Prior to her recent appointment she was assistant to Mr. Dinkins.

Mr. Dinkins resigned to go into his own business in Scott, La. He will devote his efforts to retail merchandising and farming.

The Board of Directors of The Dayton Power and Light Co. has elected JAMES M. STUART a director of the company, filling the vacancy caused by the recent death of O. H. HUTCHINGS. Mr. K. C. Long, president and general manager of the company, announced also that the Board had appointed Mr. Stuart to the position of associate general manager of the company. In this capacity, Mr. Stuart will continue in charge of electric operations and several other divisions of the company will be added to his responsibilities. Mr. Stuart will continue as vice-president, to which position he was elected on Jan. 1, 1947.

While he has worked practically in every department of the company, the highlights of his advancement are assistant supervisor of the underground department, March, 1930; supervisor of the same department, August, 1937; manager of the electric division, November, 1942; manager and vice-president of electric operations, January, 1947; director and vice-president in March, 1948 of six Greenville, Ohio, subsidiary electrical properties acquired by The Dayton Power and Light Company.

Mr. Stuart is a member of the American Institute of Electrical Engineers, Engineers' Club of Dayton, National Association of Foremen, Dayton Chamber of Commerce and Ohio Chamber of Commerce.

C. V. SORENSON, formerly president of the Indiana Service Corp., Fort Wayne, has been elected vice president and general manager of the Indiana and Michigan Electric Co., South Bend, Indiana. Announcement of the merger of Indiana Service into Indiana and Michigan Electric has recently been made by Philip Sporn, president of Indiana & Michigan and of its parent organization, the American Gas & Electric Company.

Mr. Sorenson's experience in the utility industry, embracing a period of 35 years, has covered all phases of the business, including operations, construction and market development. He has been president of Indiana Service Corp. since 1945.

He has been active in the Edison Electric Institute, the Indiana Electric Association and the American Gas Association.

Consolidated Edison Company of New York, Inc., has announced the election of NILS T. SELLMAN, as assistant vice president. Mr. Sellman will assist Brig. Gen. Ephraim F. Jeffe, vice president in charge of sales. The election follows Mr. Sellman's resignation as vice president of the Westchester Lighting Company and the Yonkers Electric Light and Power Company, subsidiaries of Consolidated Edison.

Consolidated Edison has also announced that L. A. SCOFIELD, assistant vice president, has been elected vice president of Westchester Lighting and Yonkers Electric Light and Power. Mr. Scofield will retain his position with Consolidated Edison, handling special assignments.

Mr. Sellman joined the Consolidated Gas Company of New York in 1913, after graduating from Stevens Institute of Technology with a degree in mechan-

ical engineering. He began his utility career as a test engineer of appliances. He served in World War I and, in 1921, went to the American Gas Association, becoming assistant secretary-manager and devoting considerable time to the formation of the Association's testing laboratory.

Mr. Sellman returned to Consolidated Gas in 1925 as engineer of utilization. Prior to the 1936 merger of gas and electric companies into the present Consolidated Edison Company, Mr. Sellman served as a director of several of the gas companies. Following the merger, he was elected assistant vice president of sales, a post which he relinquished in 1944 when he was elected a vice president of Westchester Lighting and Yonkers Electric Light and Power.

Mr. Scofield joined the former New York Edison Company in 1912 as an assistant tester. He transferred to the United Electric Light and Power Company before leaving for service in World War I. When he returned, he was appointed assistant general foreman and later became assistant superintendent of distribution engineering for both the United Electric Light and Power and New York Edison companies.

After the 1936 merger, he was made general superintendent of Service Inspection and Records and then manager of Outside Plant Construction. He was appointed general sales manager in 1945 and became assistant vice president for sales later the same year.

In World War II, Mr. Scofield was active in civilian defense activities in New York. He helped to organize the Public Works Emergency Division. As a consultant on the staff of General Brehon Somervell, commanding general of the Army Service Forces, Mr. Scofield reorganized that group's Industrial Personnel Division.

Albert A. Cree, president of Central Vermont Public Service Corp., announced three changes in officer personnel. GLOVER W. ROGERS has been elected treasurer, HORACE J. LYNE has been elected auditor and PRESCOTT H. WELLMAN, formerly secretary and treasurer of the corporation, will continue as secretary, having resigned from the treasurer's duties for reasons of health.

Mr. Wellman, who has been secretary and treasurer since April, 1938, moved to Rutland in the employ of CVPS in 1937. He is a trustee and former treasurer of the Rutland Free Library. Prior to joining CVPS, Mr. Wellman had been treasurer of Wellman, Oakes and Higgins, Inc., of Boston. Other previous business connections have been with American Felt Company, Boston, and Congoleum-Nairn, Inc., New York and Boston. Mr. Wellman graduated from Harvard University in 1913.

Mr. Rogers has been auditor and chief accounting officer of CVPS since the organization of the company in 1929, having been previously employed by its predecessor companies. A graduate of Boston University, he is a trustee of Rutland Junior College, director of the Rutland Child Health Clinic, a member of the Rutland Chamber of Commerce and of the accounting section of the New England Gas Association. Active in American Legion affairs, he is past-commander of Rutland Post 31 and presently a member of the Boys' State committee and Hospital Service Fund committee of the Department of Vermont.

Mr. Lyne has been employed by Central Vermont Public Service Corp. since February, 1945, as assistant to the auditor. From 1942 to 1945, he was assistant treasurer of Vermont Utilities, Inc., Chester, Vt., and chief accountant of Allied New Hampshire Gas Co. A graduate of Bryant College, Providence, R. I., Mr. Lyne was first employed by the Fall River Gas Works Co. at Fall River, Mass., and later as treasurer of the Portsmouth, N. H., Gas Co. until 1942.

J. ROSCOE FURBER has been appointed general sales manager of the Northern States Power Co., Minneapolis, and JOSEPH A. BUSCH manager of the municipal and resale department to succeed Mr. Furber. These new appointments follow the recent election of CARL T. BREMICKER as vice president in charge of sales.

Mr. Furber has been connected with the power company since 1924 as student trainee, sales engineer and manager of the municipal and resale department.

Mr. Busch has been identified with the company for 16 years and before going to Minneapolis he served in various capacities with the Chicago Northwestern Railway and for six years as a manufacturers' representative in Boston and Philadelphia.

CHARLES P. WAGNER, manager of the farm service department, Northern States Power Co., has been appointed vice chairman of the rural electric division of the American Society of Agricultural Engineers.

HAROLD T. RANKIN, superintendent of the lighting department of the Public Service Co. of Colorado, Denver, who was elected president of the Rocky Mountain Electrical League is one of the outstanding illuminating engineers in the West. A leader in the promotion of all branches of modern electric lighting, Mr. Rankin was a factor in the introduction of mercury vapor street lighting in Denver and of fluorescent lighting in the West.

Mr. Rankin joined the Public Service Co. of Colorado in 1920. Since that time he has been identified with every important lighting activity in the Rocky Mountain area. During the recent war he was head of the blackout committee for the state of Colorado. He is a former chairman of the Illuminating Engineering Society, Rocky Mountain chapter, and since 1925 has taken an active part in all phases of the Rocky Mountain Electrical League's activities.

ANTHONY F. GRAMM has been appointed electrical supervisor of the Consumers Power Co., Jackson, Michigan. He succeeds the late Percy P. Mooney. Mr. Gramm began his utility career by working in spare time and during school vacations for the Mt. Horeb Heat, Light & Power Co. Following graduation from the University of Wisconsin in 1925, he joined Consumers at the Jackson steam plant. He has been connected with the company continuously since that time. He has served on the general office staff of the electric production and transmission department; engineer in the load dispatching section, construction engineer and as assistant electrical supervisor. In his new position, he will have general supervision over the operation and maintenance of electrical equipment used by the electric production and transmission department.

HOWARD V. BARR has been appointed superintendent of the Tidd generating plant of the Ohio Power Company at Brilliant, Ohio, and HOWARD R. ANDREWS, superintendent at Tidd since 1945, has been transferred to a similar position at the new Philip Sporn plant now under construction at Graham Station, W. Va. The Philip Sporn plant is jointly owned by Ohio Power Co. and the Appalachian Electric Power Co. Joining Ohio Power Co. in 1924, Mr.

Barr served in various engineering positions at the company's Philo plant until his promotion and transfer to Tidd in 1947 as assistant superintendent. Mr. Andrews, associated with Appalachian Electric Power from 1929 to 1945, was plant superintendent at Kenova and Logan, W. Va., prior to going to the Brilliant plant in 1945.

DON WILLIS, sales promotion and advertising manager of Central Arizona Light & Power Co., Phoenix, Arizona, has been named general sales manager, succeeding MILTON G. SANDERS, vice-president in charge of sales, who has resigned.

Mr. Willis has been with the company 18 years. In advertising and sales promotion work all that time, he started as a window display artist.

Mr. Sanders resigned to become an associate in an organization that engages in public relations, sales consulting and personnel development work. He has been with Central Arizona Light & Power Co. for 13 years, starting in the advertising department.

G. L. STANTON, director of advertising and publicity for the Idaho Power Co., Boise, has been elected president of the Advertising Association of the West.

CLARENCE S. COLE, superintendent of electrical and mechanical maintenance for the Niagara Falls Power Co., Niagara Falls, N. Y., has been promoted to assistant general superintendent of the company. He succeeds CHARLES A. CLANCY, who was recently transferred to the Canadian subsidiary. DANIEL W. BROWN, who has been chief electrician for the company, has been named superintendent of electrical and mechanical maintenance succeeding Mr. Cole.

G. E. ROBERTSON, formerly chief of plants in the Little Falls Division of the Minnesota Power and Light Co., Duluth, has been appointed superintendent of hydroelectric generation for the company. Mr. Robertson succeeds WILLIAM EVANS, retired. Mr. Robertson's connection with the company began in 1912, and Mr. Evans' 32 years ago.

H. L. CUSHING has been appointed system residential sales supervisor for the Appalachian Electric Power Co., Roanoke, Va. Mr. Cushing was formerly connected with an electrical company at Dallas, Texas, in the capacity of district sales manager. He started with Appalachian Electric Power system as commercial manager of the Kingsport Utilities, Inc., from 1925 to 1928. He was transferred to the Ohio Power Co. in 1928 and was manager of residential sales at Canton and Newark until 1945, when he joined the Texas electrical company.

E. H. FINKELNBURG, vice president and general manager of the Mississippi Valley Public Service Co., Winona, Minn., has been elected president of the North Central Electric Association for the year 1948-49.

Mr. Finkelnburg joined Mississippi Valley Public Service Company as electrical engineer in 1918 and was appointed vice president and general manager in 1943. His early experience included connections with the U. S. Steel Corp. at Gary, Ind.; the Milwaukee Electric Railway and Light Co. and Stone and Webster.

CHANDLER W. JONES has been appointed assistant vice president of the New England Electric System, Boston. An electrical engineering graduate of Worcester Polytechnic Institute, Mr. Jones has been employed by General Electric and joined the New England Power system in 1927. His engineering and construction activities have covered a wide range. In the recent war, he was loaned to the Office of War Utilities, Washington, as chief of the equipment production branch.

Promotion of several sales executives has been announced by the Rochester (N. Y.) Gas & Electric Co.

WALTER G. MCKIE is the new domestic sales manager, succeeding FRANK M. HOUSTON, who recently retired after 38 years in utility sales work. Mr. McKie, formerly assistant sales manager, is a graduate of the University of Michigan and has been with the Rochester utility for 26 years. He has been active in affairs of the Rochester Sales Executives Club and the Electrical Association of Rochester.

LAWRENCE P. FRIDLEY, who has been with the company since 1938, has been made assistant sales manager to succeed Mr. McKie. HARRY J. TAILLIE, who became identified with the company in 1913, has been made supervisor of builder and architect relations.

HARLEIGH W. RILEY, commercial manager of the Indiana & Michigan Electric Co., South Bend, has retired after 43 years with the company. Mr. Riley was for 27 years in the company's merchandising division at Buchanan. Later he was transferred to the home office at South Bend to act as manager of residential sales for the entire organization, and in 1934 became commercial manager. After his retirement, Mr. Riley will remain in the company service as a consultant.

BARTHOLOMEW D. BARRY, JR., has been appointed power and lighting sales engineer for the Northern Berkshire Gas Co., North Adams, Mass. He has lately held this position with the Lawrence, (Mass.) Gas & Electric Co. Mr. Barry succeeds RALPH A. POTTER, who has left New England to enter the electrical field in Utah.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND JULY 2, 1946

Of EDISON ELECTRIC INSTITUTE BULLETIN, published monthly at Philadelphia, Pa., for October, 1948.

State of New York. } ss:
County of New York. }

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Wilgar Coleman, who, having been duly sworn according to law, deposes and says that he is the Editor of the EDISON ELECTRIC INSTITUTE BULLETIN, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management . . . etc., of the aforesaid publication for the date shown in the above caption, required by the act of August 24, 1912, as amended by the acts of March 3, 1933, and July 2, 1946 (section 537, Postal Laws and Regulations) . . . to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business manager are: Publisher, EDISON ELECTRIC INSTITUTE, 420 Lexington Avenue, New York City 17; Editor, Wilgar Coleman, 420 Lexington Avenue, New York City 17; Managing Editor, none; Business Manager, none.

2. That the owner is: EDISON ELECTRIC INSTITUTE—not incorporated—trade association; Ernest R. Acker, President, 420 Lexington Avenue, New York City 17; K. B. Crumb, Treasurer, American Gas & Electric Service Corp., New York; Mae B. Woods, Secretary, 420 Lexington Avenue, New York 17.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporatin has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

WILGAR COLEMAN,
Editor.

Sworn to and subscribed before me this 11th day of October, 1948.

(Seal) MAE B. WOODS,
Notary Public, Queens County.
(My commission expires March 30, 1950)

Accident Prevention Committee Meeting

(*Continued from page* 351)

law recently enacted in New Jersey making the operation of equipment within 6 ft. of high-voltage lines a misdemeanor. This law is patterned after one previously enacted in California to force attention to the hazard of operating equipment such as cranes and derricks in the vicinity of overhead lines.

Third National Farm Electrification Conference To Meet in Chicago Nov. 17-19

(*Continued from page* 334)

tour of agricultural sections "in front of and behind Europe's Iron Curtain"; A. W. Turner, assistant chief, Bureau of Plant Industry, Soils and Agricultural Engineering, United States Department of Agriculture; B. W. Clark, vice-president, Westinghouse Electric Corporation; Ervin Martin, National President, Future Farmers of America; Mrs. Charles W. Sewall, administrative director, Associated Farm Women; C. D. Leiter, Sales Manager, F. E. Myers and Bro. Co., and L. M. Knox, farmer.

Panels will feature farm women, editors and executives of major farm and electrical magazines, leading home economics specialists, retailers, distributors and wholesalers, power suppliers and manufacturers.

In addition to day-time meetings, plans have been made this year to conduct informal discussions and programs on Wednesday and Thursday evenings, Nov. 17 and 18.

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CONVENTIONS AND MEETINGS

1948

NOVEMBER

1-3 Wisconsin Utilities Association, Commercial and Technical Divisions, Pfister Hotel, Milwaukee, Wis.
4-5 Pennsylvania Electric Association, Systems Operation Committee, Benjamin Franklin Hotel, Philadelphia, Pa.
4-5 Pennsylvania Electric Association, Communications Committee, Hotel Schenley, Pittsburgh, Pa.
5-6 Public Utilities Association of the Virginias, Greenbrier Hotel, White Sulphur Springs, W. Va.
8-13 National Electrical Manufacturers Association, Hotel Traymore, Atlantic City, N. J.
10-12 Southeastern Exchange, General Sales Conference, Atlanta, Ga.
15-18 National Association of Railroad and Utilities Commissioners, Savannah, Ga.
17-19 National Farm Electrification Conference, Congress Hotel, Chicago, Ill.
18-20 New Jersey Utilities Association, Sea View Country Club, Absecon, N. J.
28-Dec. 3 American Society of Mechanical Engineers, Hotels Pennsylvania and New Yorker, New York, N. Y.
29-30 Prime Movers Committee, EEI, New York, N. Y.
30-Dec. 3 National Electrical Contractors Association, Roney Plaza, Miami Beach, Fla.

DECEMBER

5-8 The American Society of Refrigerating Engineers, Washington, D. C.

JANUARY—1949

19-21 American Society of Civil Engineers, Annual Meeting, New York, N. Y.
20 Industrial Relations Committee, EEI, New York, N. Y.
24-25 Accident Prevention Committee, EEI, Book-Cadillac Hotel, Detroit, Mich.
Jan. 31-Feb. 4 American Institute of Electrical Engineers, Hotel Pennsylvania, New York, N. Y.

FEBRUARY

10-11 Transmission and Distribution Committee, EEI, Netherland Plaza Hotel, Cincinnati, Ohio
13-15 Industrial Relations Committee, EEI, Chicago, Ill.
14-15 Electrical Equipment Committee, EEI, New Jefferson Hotel, St. Louis, Mo.

MARCH

13-18 National Electrical Manufacturers Association, Winter Convention, Edgewater Beach Hotel, Chicago, Ill.
17-18 Industrial Relations Committee, EEI, Baltimore, Md.
29-Apr. 1 Third International Lighting Exposition and Conference, Stevens Hotel, Chicago, Ill.

APRIL

5-7 Fifteenth Annual Sales Conference, EEI, Edgewater Beach Hotel, Chicago, Ill.
11-13 National Conference of Electric and Gas Utility Accountants, Book-Cadillac Hotel, Detroit, Mich.
13-15 Southeastern Exchange, Annual Convention, Boca Raton Hotel, Boca Raton, Fla.
20-23 American Society of Civil Engineers, Oklahoma City, Okla.

MAY

1-6 National Electrical Wholesalers Association, Netherland Plaza Hotel, Cincinnati, Ohio.
2-4 Engineering Committees, EEI, Edgewater Beach Hotel, Chicago, Ill.
2-5 Chamber of Commerce of the U. S. A., Washington, D.C.
16-19 National Fire Protection Association, Fairmont Hotel, San Francisco, Calif.

JUNE

1-3 ANNUAL MEETING, EDISON ELECTRIC INSTITUTE, Atlantic City, N. J.
20-21 Public Utilities Advertising Association, Netherland Plaza Hotel, Cincinnati, Ohio
27-30 Canadian Electrical Association, Lake Louise, Banff, Canada

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